John Days Coffee Watershed Analysis

Roseburg District
South Douglas Resource Area

Draft August 30, 1995
Revised September 30, 1995

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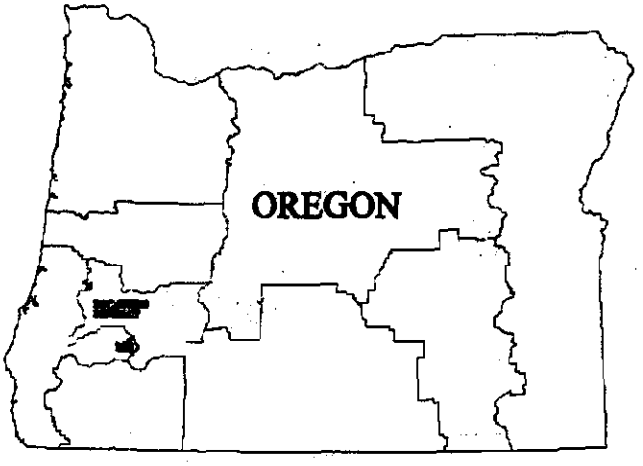
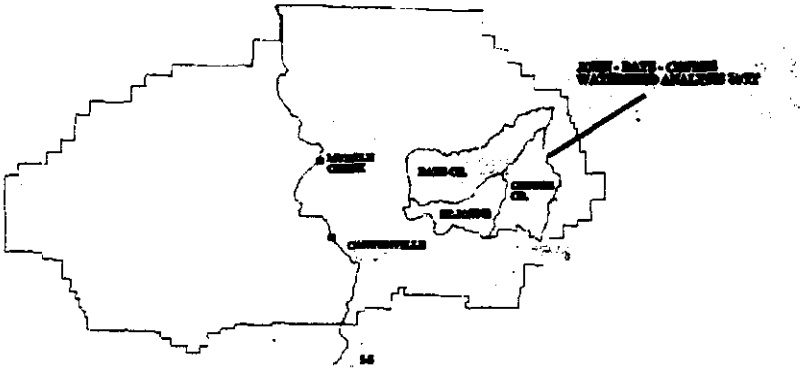
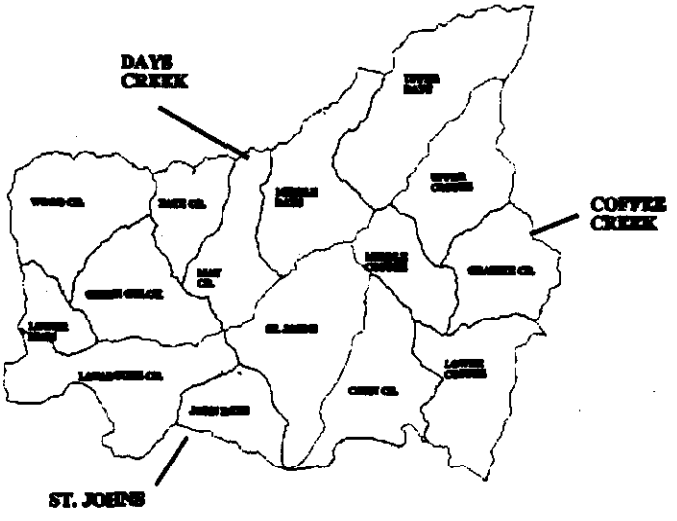
Figure 1: VICINITY MAP



South Douglas Resource Area



John-Days-Coffee Watershed Analysis Unit & Sub-basins



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I. Characterization of the Watershed

The John - Days - Coffee (JDC) Watershed Analysis Unit (WAU) is located within the South Douglas Resource Area on the Roseburg District. The WAU is comprised of the St. John, Days Creek, and Coffee Creek watersheds. This area is approximately 48,473 acres in size, and is roughly located between Days Creek, Oregon and Milo, Oregon, north of the South Umpqua River, and County Highway 1.

There are fifteen sub-basins delineated within these watersheds as follows:
Days Creek - Lower Days, Wood Creek, Green Gulch, Fate Creek, May Creek, Middle Days, Upper Days
St. John Creek - Lavadoure Creek, John Days, St. John
Coffee Creek - Lower Coffee, Corn Creek, Middle Coffee, Granite Creek, Upper Coffee

The John - Days - Coffee WAU is part of the larger South Umpqua Basin. The South Umpqua Basin is identified as a Tier 1 Key Watershed in the Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, Attachment A to Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl (ROD). Tier 1 Watersheds were previously identified by the Scientific Panel on Late-Successional Forest Ecosystems(1991) and the Scientific Analysis Team Report (1993).

Tier 1 Watersheds are designed to serve as refugia for maintaining and recovering habitat for at-risk stocks of anadromous salmonids and resident fish species. The South Umpqua Basin has been identified as water quality limited by the Oregon Department of Environmental Quality (DEQ) in their 1994 Water Quality Assessment. Key Watersheds with lower quality habitat were selected for their high potential for restoration and are designed to become future sources of high quality habitat with the implementation of a comprehensive restoration program (ROD, B-18).

Within this WAU, BLM administers approximately 19996 acres of land. Most of this land is intermingled with approximately 28,469 acres of private ownership in a checkerboard pattern. Upper Days Creek and Coffee Creek contain a block of BLM administered land. BLM administered lands with this Tier 1 Watershed area are composed of Matrix lands and Riparian Reserves. Matrix lands are further delineated into General Forest Management Area (GFMA - 12323 acres), and Connectivity (CONN - 7652 acres).

Water flows from the uplands of the sub-basins to the mainstem streams, which then empty into the South Umpqua River. The bottomlands, typical of private ownership in southwestern Oregon, are characterized by agriculture land, small stands of second growth and/or hardwoods, and open meadows. Uplands are generally commercial forest lands in various age classes and patch sizes.

Road building, clearing of land for agriculture, grazing, and timber harvest have altered the landscape. Some impacts of these activities to streams are increased sedimentation, loss of

large wood from the some stream segments, and low summer flows. Timber harvest, agriculture, and grazing remain important uses within the watershed. Water for irrigation and domestic consumption are important human uses. The pattern of ownership within the JDC WAU limits some of the opportunities to improve stream conditions. BLM administered land is more concentrated in the uplands, and headwaters, while private land occupies more of the lower reaches along the main channels.
The John Days Coffee WAU contains habitat for anadromous and resident fish species.. The majority of anadromous habitat falls with in the Days Creek watershed. The Coffee Creek and St. John watersheds have less anadromous habitat due to steeper gradients and stream blockage.

II. Identify Issues

The purpose of developing issues is to focus the analysis on the key elements of the ecosystem that are most relevant to the management questions, human values, or resource conditions within the watershed?
Site specific project areas identified by this watershed analysis will receive more in-depth analysis during the I.D. team project development and NEPA process. New information gathered during the I.D. team process will be appended back to the watershed analysis document as an update.

The South Douglas Resource Area watershed team has identified the following issues/needs that will drive the information gathering process for this analysis. They are summarized as follows:

ISSUE 1 - Watershed Health and Restoration

Tier 1 Key Watersheds have been identified as priority areas for watershed restoration. This management need is supported in the Roseburg District Record of Decision and Resource Management Plan (RMP pg. 21), which outlines priorities for watershed restoration.

The top priority component of a watershed restoration program involves road treatments (such as decommissioning or upgrading), which will result in reduced sedimentation, reduced erosion, and improved water quality. The RMP further states under Management Actions/Direction (RMP pg. 20) to "reduce existing road mileage within Key Watersheds. If funding is insufficient to implement reductions, neither construct nor authorize through discretionary permits a net increase in road mileage in Key Watersheds."

The next priority deals with riparian vegetation. Silviculture treatments such as planting unstable areas along streams, thinning densely-stocked young stands, releasing young conifers overtopped by hardwoods, reforesting shrub and hardwood dominated stands with conifers, will result in improved bank stabilization, increased shade, and accelerated recruitment of large wood desirable for future in-stream structure.

The lowest watershed restoration priority involves the design and placement of in-stream habitat structure in an effort to increase channel complexity and number of pools.

Key Questions

Vegetation Patterns

What is the array and landscape pattern of plant communities and seral stages in the watershed (riparian and non-riparian) and what processes caused these patterns?

How are Riparian Reserves functioning within the Watershed?

Soils / Erosion

What are the dominant erosion processes within the WAU and where have they occurred or are likely to occur?

Hydrology / Channel processes

What are the dominant hydrologic characteristics (e.g. total discharge, peak flows, and minimum flows) and other notable hydrologic features and processes in the watershed?

Water Quality

What are the limiting factors affecting water quality, and where are the priority opportunities to improve water quality and hydrologic conditions?

What beneficial uses dependant on aquatic resources occur in the watershed and which water quality parameters are critical to these uses?

Fisheries

Where are the locations of fish populations, historic and existing?

How have fish habitat and fish populations been affected by hydrologic processes and human activities?

What and where are the priority restoration opportunities to benefit fisheries?

ISSUE 2 - Harvest Potential

Matrix lands within Key Watersheds are responsible for contributing to the Probable Sale Quantity (PSQ) while still meeting the additional management requirements placed on Key Watersheds (RMP pg. 20). Objectives in the matrix (RMP pg. 33) include the following:
1) Produce a sustainable supply of timber and other forest commodities.
2) Provide connectivity (along with other allocations such as Riparian Reserves) between

Late-Successional Reserves.
3) Provide habitat for a variety of organisms associated with both late-successional and younger forests.
4) Provide for important ecological functions such as dispersal of organisms, carryover of some species from one stand to the next, maintenance of ecologically valuable structural components such as down logs, snags, and large trees.
5) Provide early-successional habitat.

Conflicts with other resource values will be mitigated through the interdisciplinary process, by adjustments in the spacing and timing of activities. Once projects are identified, these areas will undergo further development and evaluation through the NEPA process.

Key Questions

Vegetation Patterns

What are the natural and human causes of changes between historic and current vegetation conditions?

Where are the stands of harvestable age within the matrix?

How can we adjust scale, timing and spacing of harvest areas to minimize fragmentation and maintain the function of large forest blocks?

What opportunities are there in the Elk Management Area (upper Coffee and Days Creek watersheds) to improve elk habitat through vegetation manipulation.

Special Status Species

What is the distribution of species of concern that are important in the watershed (e.g. threatened or endangered species, special status species, species emphasized in other plans, etc.) and what is the distribution and character of their habitats?

How can scheduling of potential harvest areas be prioritized to minimize impacts to wildlife and hydrologic processes while still meeting the objectives for matrix lands established in the ROD & RMP.

III. / IV. Current and Reference Conditions

VEGETATION

Historic Overview

The watersheds that make up the JDC WAU are located in two geographical provinces that make up the Roseburg District; the Klamath Province and the Cascade Province (Franklin and Dyrness 1984). Climax vegetation in the watershed reflects the Douglas-fir and evergreen temperate forest (Franklin and Dyrness 1984). Below 2500 feet elevation, the overstory is

predominantly Douglas -fir mixed with incense cedar, grand fir and madrone. Brush species include ocean spray, hazel and willow. Above 2500 feet, the overstory is dominated by Douglas-fir in association with western hemlock, sugar pine and chinquapin. Brush species include Pacific rhododendron, salal and ceanothus.

Fire played a major role in the development of the historic patterns of vegetation within the JDC WAU. Over time, the land was likely a constantly changing mosaic of different age classes - mature stands, remnant patches of old-growth trees, and younger even-aged stands that resulted from stand replacement fires. These fires were man caused (Indians used fire to clear lands, improve hunting areas, and produce desirable plant species) as well as lightning caused. Native American burning kept the lower elevations open and covered with lush native grasses. Fire suppression policies established early in this century, resulted in the replacement of the an open forest with a more closed canopy forest with patches of dense undergrowth.

The 1987 Bland Mountain Fire is a classic example of a large stand replacement fire. It began in the St. Johns watershed and swept through most of the Lavadoure Creek sub-basin, before jumping the South Umpqua River and moving into Stouts Creek. The fire rapidly grew to over 10,000 acres. An aerial observer estimated that fire swept through the Lavadoure Creek drainage in less than twenty minutes.

Journals kept by early explorer, settlers, and surveyors indicate that the Umpqua Valley was in a state of mixed conifer forests of varying age classes at the time of settlement by pioneers migrating west. As settlements were established along the interior valleys, the need for lumber, and land conversion to agriculture resulted in the harvest of timber. These harvests began in the lower elevations, dictated by the logic of easy access and proximity to processing locations. At the time the O & C lands reverted back into federal management (1916), private lands in the Umpqua Valley continued to be harvested, and previously harvested areas were in various stages of second growth or had been converted to other uses. Federally administered lands at this time were comprised mainly of uncut, natural stands. Harvest of timber on BLM administered lands began in the early 50's and continued at a fairly steady rate through the 1980's. The current age class distribution on BLM administered lands reflect this.

Various vegetation age classes have been documented in the JDC watershed. For this analysis, vegetation on BLM administered lands is defined as the age of the dominant conifer cover for each stand, aggregated into groupings of ten-year age classes (see Map 1). These groupings were selected because they represent an array of wildlife habitat types. Private lands are aggregated by the same age class groupings, using either a dominant conifer or hardwood stand age. Significant agricultural acreage is also identified (see Map 2).
The arrangement of these age classes on the landscape within the watershed is a result of natural disturbance (fire, blowdown), historic and current disturbance conducted by people (introduced fire for clearing, timber harvest, road construction, home building and division of land by straight line boundaries, etc.).

BLM Administered Lands

BLM administered lands comprise approximately 41 percent (19996 acres) of the WAU. A significant portion of these lands are in block ownership in the northeast portion of the WAU, in upper Days Creek and Coffee Creek watersheds. Coffee Creek and Days Creek contain larger acreages of mature stands, while the St. John watershed reflects the impact of the 1987 Bland Mountain Fire, which killed most of the mature stands in the Lavadoure Creek sub-basin (see Table 1).

Table 1: Acres by Age Class on BLM Administered Lands

WATERSHED	ACRES of age class <10	ACRES of age class = 10	ACRES of age class = 20	ACRES of age class = 30 TO 70	ACRES of age class = 80 TO 110	ACRES of age class = 120 TO 190	ACRES of age class = 200+	TOTAL
Coffee Creek	877	391	382	1050	503	1817	3180	8200
Days Creek	846	773	448	1515	693	1015	2690	7980
St. John	1097	215	360	526	200	918	500	3816
TOTAL	**2820**	**1379**	**1190**	**3091**	**1396**	**3750**	**6370**	**19996**

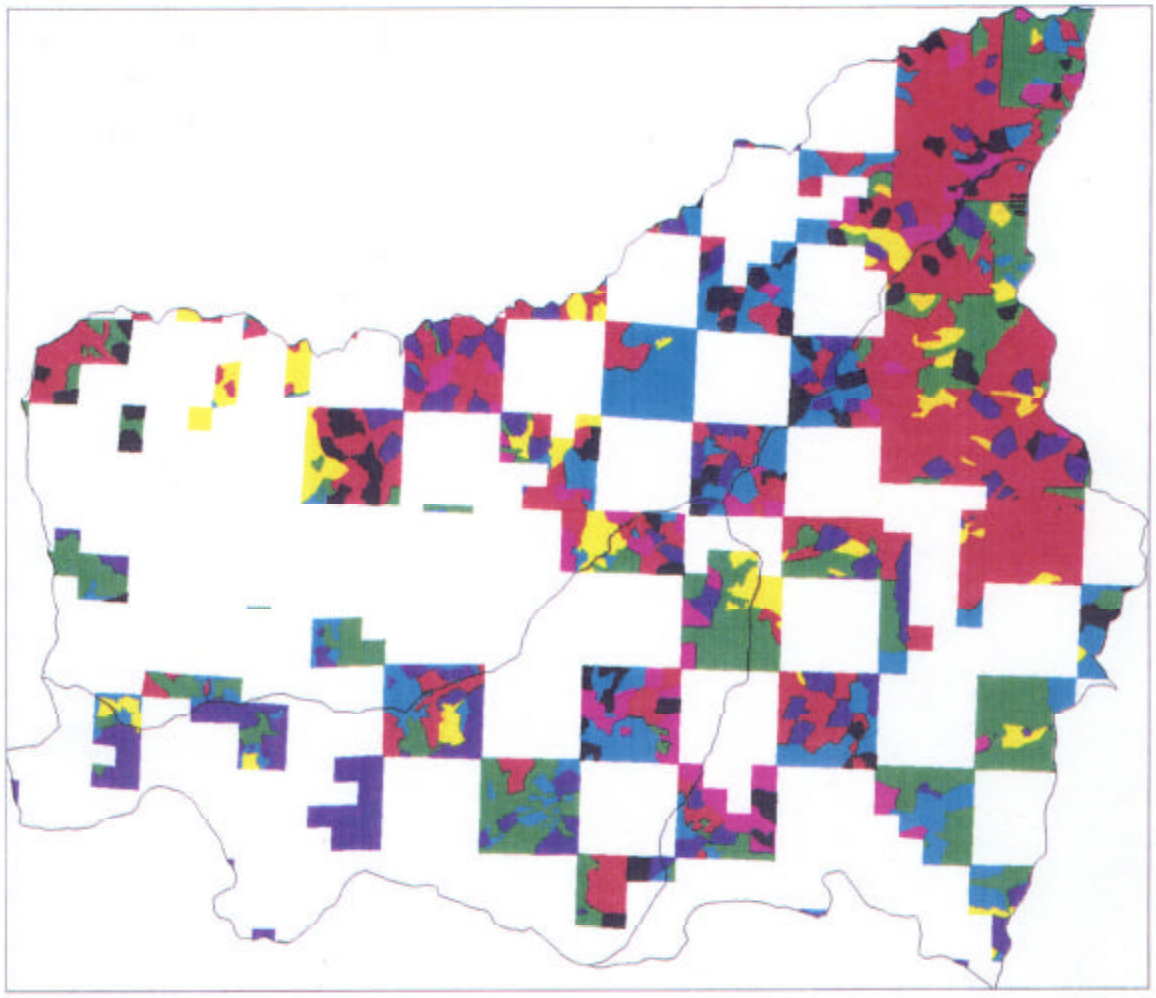
Vegetation: BLM Riparian Reserves

Riparian Reserves in the JDC WAU account for approximately 43 percent of the total BLM land base (8573 acres out of 19996 total acres) (see Table 2). The purpose of Riparian Reserves is to "maintain and restore riparian structures and functions of intermittent streams, confer benefits to riparian-dependent and associated species other than fish, enhance conservation for organisms that are dependent on the transition zone between upslope and riparian areas, improve travel and dispersal corridors for many terrestrial animals and plants, and provide greater connectivity of the watershed" (ROD, B-13). For this analysis, the riparian reserve widths were developed using a site potential tree height of 180 feet. All intermittent streams were given a riparian reserve width of 180 feet each side of the stream. Perennial streams were given a reserve width of 360 feet (2 x site tree height) each side of the stream.

Table 2: Acres by Age Class in Riparian Reserves on BLM Administered Lands

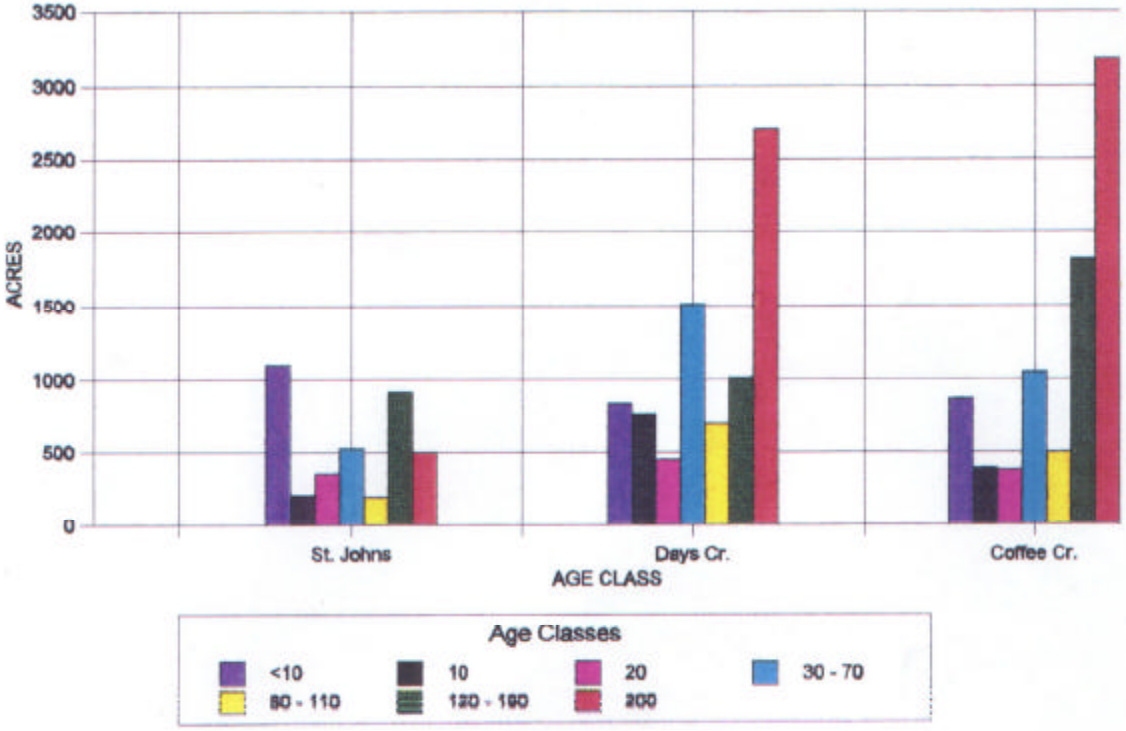
WATERSHED	ACRES of age class <10	ACRES of age class = 10	ACRES of age class = 20	ACRES of age class = 30 TO 70	ACRES of age class = 80 TO 110	ACRES of age class = 120 TO 190	ACRES of age class = 200+	TOTAL
Coffee Creek	390	192	224	507	141	667	1533	3,654
Days Creek	334	364	92	654	211	414	1090	3,159
St. John	410	158	245	234	88	424	201	1,760
TOTAL	**1,134**	**714**	**561**	**1,395**	**440**	**1,505**	**2,824**	**8,573**

Map 2: JDC WAU - BLM Age Class Distribution

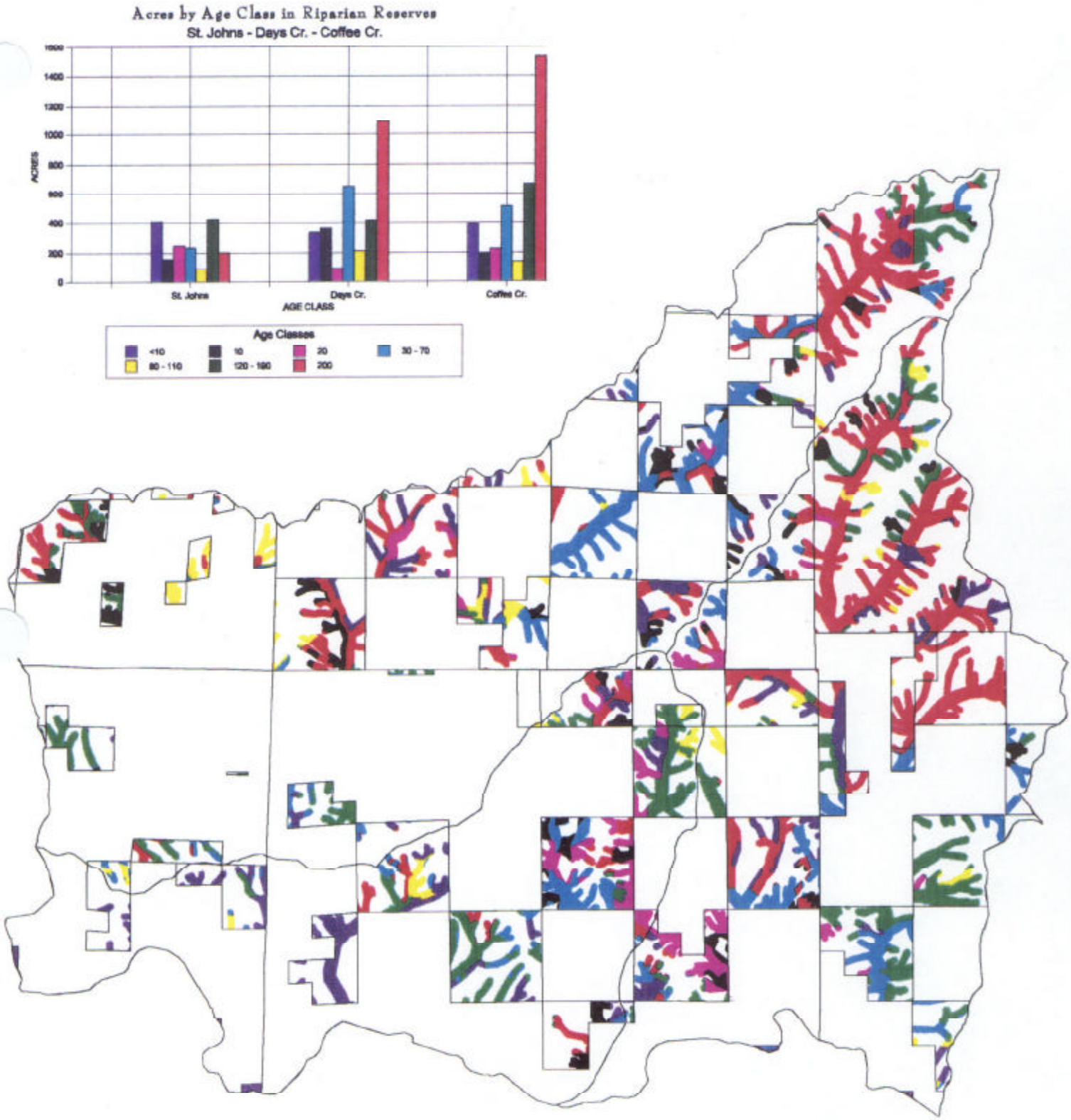


BLM Age Class Distribution

St. Johns - Days Cr. - Coffee Cr.



Map 3: JDC WAU - BLM Riparian Reserve Age Class Distribution



Private Lands

Private lands account for approximately 58 percent of the JDC WAU. Agricultural lands total approximately 5105 acres while forested lands account for 22972 acres. Private ownership is concentrated on the lower elevations of the WAU, intermingled with BLM lands in the typical O & C checkerboard pattern. Almost all of the private lands have been previously harvested. Eighty-three percent of the private forested lands is in the 30 to 70 age class (see Table 3).

Table 3: Acres by Age Class on Private Lands

AREA	Agriculture land	ACRES of age class <10	ACRES of age class = 10	ACRES of age class = 20	ACRES of age class = 30 TO 70	ACRES of age class = 80 TO 110	ACRES of age class = 120 TO 190	ACRES of age class 200+	Total
Coffee Creek	496	55	777	241	5102	8	334	35	7048
Days Creek	2341	550	235	66	10288	342	44	90	13956
St. Johns	2268	872	61	204	3666	0	2	0	7073
TOTAL	**5105**	**1477**	**1073**	**511**	**19056**	**350**	**380**	**125**	**28077**

SOILS AND EROSION PROCESSES

Soils Overview

Soils in these watersheds have developed from geologic formations developed from the late Triassic through early Cretaceous periods of the Klamath Province. Rocks from these formations consist of high angle faulted marine sedimentary and marine extrusive volcanics. Jurassic and Cretaceous rocks are locally altered to gneisses, schists, and serpentinites. A Mid to late Cretaceous granitic to dioritic pluton also outcrops in the area.
Historic erosion was most likely dominated by surface erosion processes and mass wasting. The areas of granitoid soils are suspected to have higher natural rates of erosion, based on their soil properties. The landslide map (see Map 6) indicates problem areas of historic slope stability.

The National Cooperative Soil Survey (NCSS), conducted by the Natural Resources Conservation Service (NRCS) is the source of information for this section.

The four main soils related properties significant to planning and analysis (see Map 5) for these watersheds are: granitic parent material, flood prone areas, hydric soils (wetlands), and landscape segments that commonly exhibit riparian/wetland characteristics (potentially wet).

There are 17,000 acres of granitic or granitoid soils mapped in this WAU. Days Creek watershed has 12,000 acres and Coffee Creek watershed has 5,000 acres. Flood plain soils occupy 600 acres and are most commonly found on private land ownership. Areas large enough to be mapped as hydric soils (wetlands), occupy 600 acres and are also normally found on private land. Hydric soil areas too small for mapping (NCSS, <5 acres) are commonly found on BLM managed lands. These wet areas usually exist as minor components within mapping units we have termed "potentially wet". There are 9,800 acres of "potentially wet" soils in these WAU'S. Days Creek watershed has 5,700 acres, Coffee Creek

watershed has 3,600 acres and St. Johns watershed has 500 acres. It is anticipated that less than 20% of the 9,800 acres will classify as hydric soils. Most of these hydric inclusions will be less than one acre in size. The Roseburg District RMP states that wetlands will be avoided entirely when constructing new roads (RMP pg. 24).

Landslides

A major process that can effect water quality, erosion, and sedimentation is the occurrence of landslides. Landslides can occur naturally or be triggered by human activities such as road building or logging.
The John Days Coffee WAU landslide occurrence/potential is shown in **Map 6.**
The ***translational slide areas*** (shown in red) are generally on steep slopes (60% to 100%) where debris type landslides have occurred. These areas are not suitable for forest management activities.
The area classified as ***fragile: debris type landslide potential*** (shown in gray) is characterized by slopes commonly ranging from 60% to 100% plus. Unacceptable soil and organic matter losses are expected to occur as a result of forest management activities unless mitigating measures (see Best Management Practices, Appendix J, Roseburg District Resource Management Plan/ Environmental Impact Statement) are followed to protect the soil/growing site.
The ***deep seated earthflow*** areas (shown in yellow) are characterized by undulating topography and slopes less than 60%. An area of concern associated with deep seated earthflows is located in the upper headwaters of the Days Creek watershed.
The area classified as ***fragile: mass movement potential*** (shown in blue) is characterized by undulating topography generally less than 60% where soil tension cracks and sag ponds may exist. Because of the slow rate of movement, forest management is feasible, when combined with Best Management Practices. An area of concern associated with this classification is also located in the upper headwaters of the Days Creek watershed.

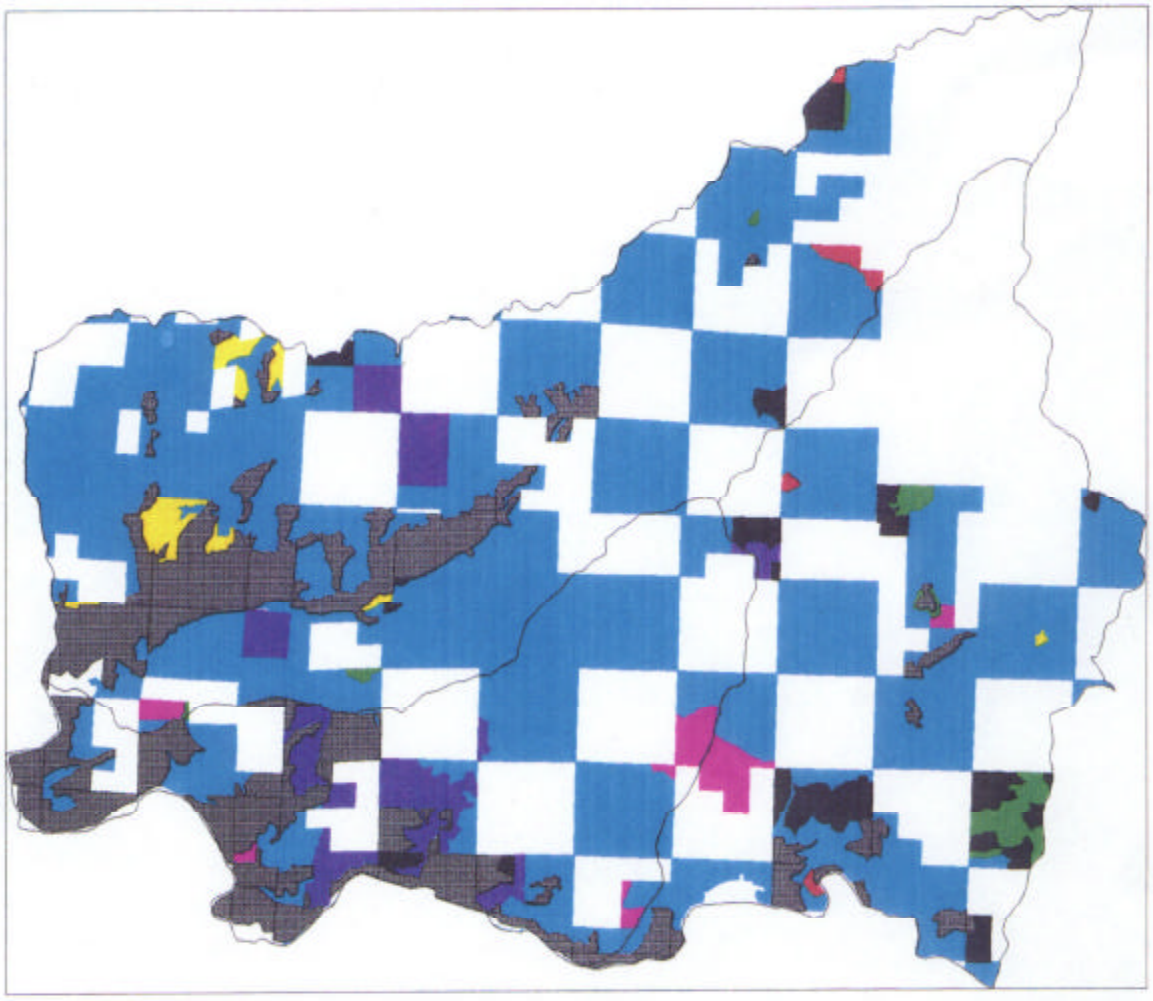
HYDROLOGY

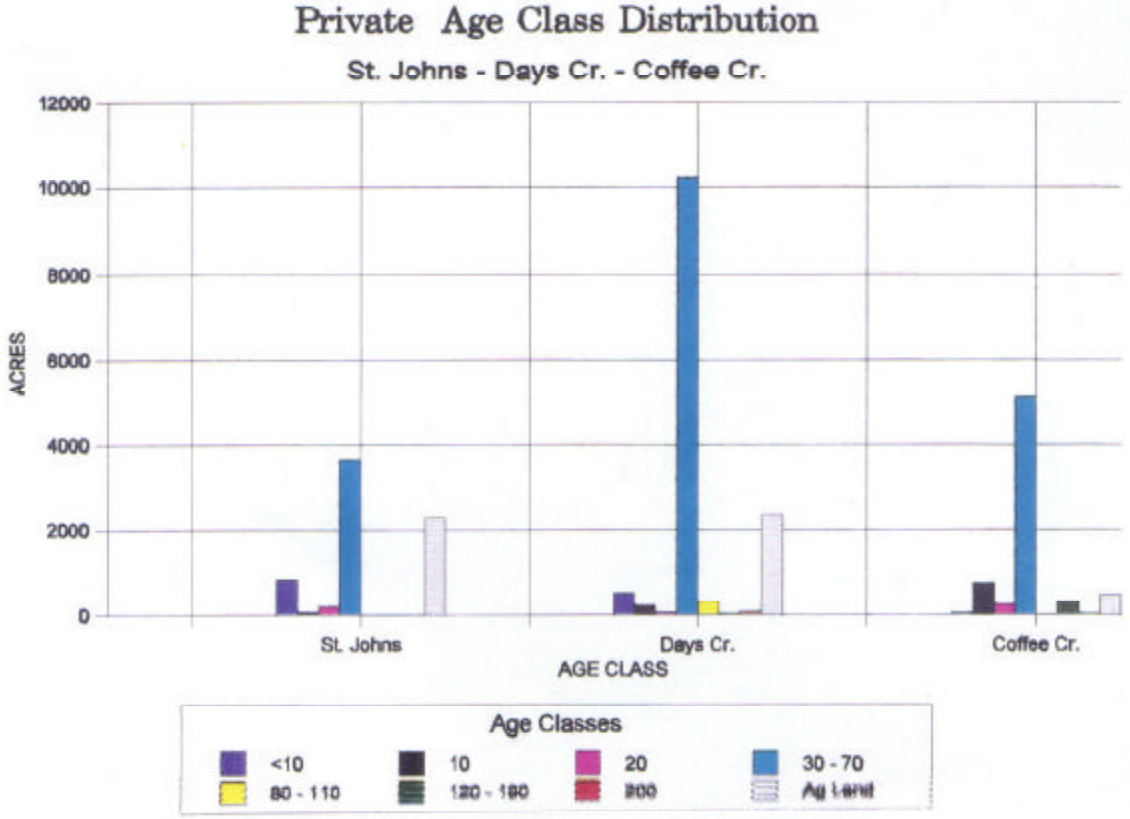
Overview

A comparison of aerial photographs from 1953 through 1994 shows an increase of roading, and clearcutting as the predominant method of timber harvest over time. Moreover, many of the roads connecting upper Days, upper South Myrtle, and upper Deadman Creeks had not yet been built in the early 1950's. With more roads being built, more timber became accessible for harvest, as well as increased numbers of stream crossings and a propensity for debris torrents.
No data exist on the historic hydrologic characteristics of these watersheds. Some logical generalizations can be made concerning total discharge, peak and minimum flows. It is assumed that prior to the construction of roads and harvest of timber, peak flows were lower due to the higher interception rate of a more continuous forested area, and lack of artificial water channeling. It is expected that prior to harvest of timber along streams, and onset of irrigation, that minimum flows were higher than they are today.

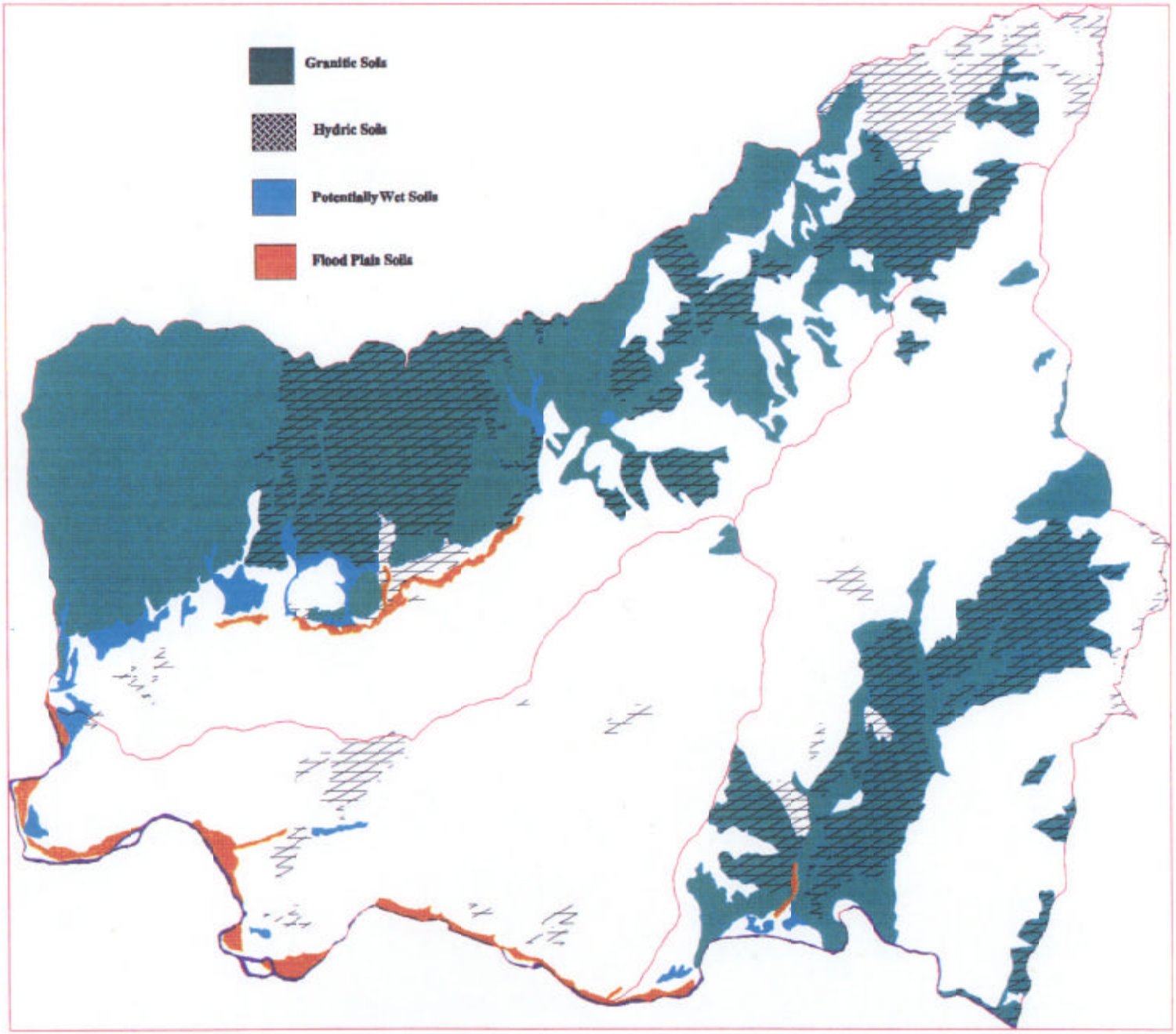
Average annual rainfall (1956-1992) measured at a permanent USGS station at Tiller, Oregon is 94 cm, with the majority of the precipitation (68 percent) occurring from October to March. The elevation of the station is approximately 330 meters. Stream discharge measured at the

Map 4: JDC WAU -Private Age Class Distribution

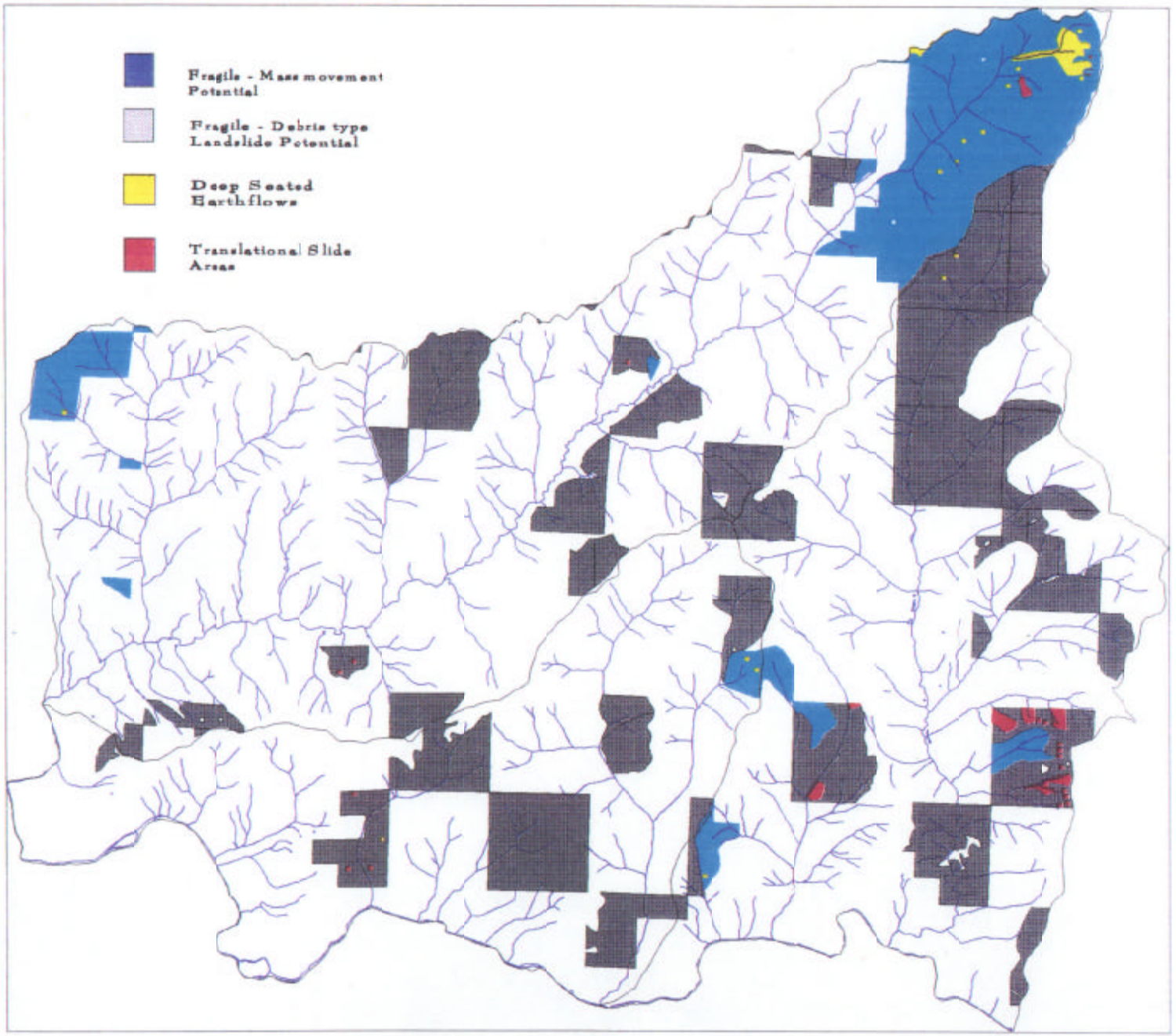




Map 5: Soils of Conc[illegible]ound in JDC WAU



Map 6: Landslide Pc al in the JDC WAU



same station closely followed precipitation (Swanston 1991) due primarily to the location and elevation of where measurements were taken. The uplands of the JDC WAU fall within the transient snow zone (2000 - 5000 ft. elevation). Flows in the transient snow zones can be extreme, especially during warm rain-on-snow events (Swanston 1991). Grant, Jones, Harr, Wemple and others have done studies relating clearcutting and road building to increased peak flows.

The soil types found in the JDC WAU, common to the South Umpqua Basin, are susceptible to soil erosion and mass wasting depending on the soil type and depth and hill slope (Richlen 1973). The South Umpqua Basin is less permeable than the North Umpqua Basin, and therefore has less water storage capacity (Rinella 1986). Deeper soils with high water storage capacities are able to generate baseflow to streams during periods of little or no precipitation. Furthermore, St. John's creek and Coffee Creek flow during the drier summer months, whereas Days creek does not flow for extended periods. The nine-year record at the Days Creek gaging station indicates the creek dried up for at least one week every year, and six of the nine years it dried up for at least 21 days.

There are 472 miles of streams in the 76 square mile watershed; with 115 miles in St. John's, 202 miles in Days Creek, and 155 miles in Coffee Creek watersheds (see Map 7). The stream densities for St. John's, Coffee, and Days creeks are 6.7, 6.4, and 5.9 miles per square mile. The stream density for the watershed is 6.3 miles per square mile. There are 177 miles of BLM streams in the watershed, and a BLM stream density of 5.7 miles per square mile. These numbers were derived from GIS HYD and ORD databases, which have varying accuracies with respect to first and second order streams.

Water Quality

The Department of Environmental Quality (DEQ) conducted a statewide assessment in 1988 on water quality conditions resulting from nonpoint sources of pollution and the affects on certain beneficial uses of water. Water quality condition, water quality conditions affecting fish, and stream quality affecting aquatic habitat were the beneficial uses identified by the 1988 assessment as severe (by observation) for Days Creek. The aforementioned beneficial uses were identified as having no problem and/or no data available for Coffee Creek. A severe sedimentation problem with supporting data was identified, but with no adverse impacts to beneficial uses. In Days Creek, moderate impacts to turbidity and erosion were observed, and severe low dissolved oxygen and low flows were also observed without data. Irrigation, stock watering, aquatic habitat, and fish habitat were the beneficial uses impacted in Days creek. The 1994 Water Quality Assessment (305b Report) is a requirement under Section 303 of the Clean Water Act and contains more specific and up-to-date water quality information. The South Umpqua Basin has been identified as being water quality limited based on water quality standards for dissolved oxygen, fecal bacteria and pH being exceeded. Aesthetics, aquatic life, and water contact recreation are beneficial uses listed as "not supporting." A "not supporting" use is the most severe classification for water quality. The State Antidegradation Policy found in the Department of Environmental Quality (DEQ) Administrative Rules in Chapter 340-26-026 is to maintain and protect surface water quality from point and nonpoint sources of pollution in order to protect State identified beneficial uses of water.

According to ODFW Aquatic Inventory Reports done on several streams within the watershed, lack of large wood in streams and within riparian zones, summer low flows and sediment are limiting factors for water quality. These limiting factors are created to a large degree from past land use practices; heavy grazing, timber removal in the riparian zone, road construction, low water ford's and stream crossings, which have cumulative impacts to water quality and fish habitat (see fisheries section).

Sediment and Turbidity

Suspended sediment refers to that portion of the sediment load suspended in the water column (MacDonald, et al.). Turbidity refers to the amount of light that is scattered or absorbed by a fluid (APHA 1980). Turbidity is caused by the finer texture particles in suspension such as clay, silt, finely divided organic and inorganic matter. Turbidity is a good indicator of clarity, and how well fish can see food. A recent review concluded that the ability of salmonids to find and capture food is impaired at turbidities in the range of 25-70 NTU (Lloyd et al. 1987).

Turbidities and suspended sediment numbers are highest due to peak discharges during the winter months. Peak flows cause streambank erosion, bedload transport, and the movement of particles into the water column. An analysis of suspended sediment and turbidity records over a ten year period at Days Creek gaging station (14308685) indicates the highest numbers for suspended sediment occurred on February 24 and 26, 1986 and January 10, 1989, and are 3300, 3355, and 1436 mg/l-1 respectively. Turbidities were also at their highest on these dates, 99, 90, and 355 respectively. Peak flows of 436 and 1180 cubic feet per second occurred on February 18, 1986 and January 10, 1989. The average sediment yields for February 18, 1986 and January 10,1989 were 52 tons/square mile and 469 tons/square mile respectively. A comparison of sediment yields for similar time periods was done with Canton Creek and South Fork Smith River to show relative differences in watersheds. The sediment yields for South Fork Smith River for February 22 and 23, 1986 are 152 and 87 tons/square mile and 120 tons/square mile on January 10, 1989. A study of suspended sediment in southwestern Oregon (Curtiss 1975) found that the South Umpqua River at Tiller produced 310 tons/square mile and Cow Creek near Azalea, Oregon produced 290 tons/square mile. Future analysis' should review turbidity per unit of flow and total annual sediment yields versus discharge (suspended load rating curve) for the period of record, and compare them to other watersheds within the Roseburg District.

Roads / Cross Drains

Roads have been identified as a major impact on the forest environment and have been explicated in numerous publications. Roads can introduce sediment into the stream channel because of surface drainage, stream crossings, and improper design. Most of the roads built were designed without BMPs in place, and prior to legislation which directs companies and agencies to maintain and protect water quality from nonpoint sources of pollution. Many of the culverts located in the upper reaches of the watershed are undersized and become plugged during peak flow events. This can cause water to run over the road surface and subsequently input large amounts of sediment into the channel. Over time, sediment buildup in the upper streams provides a source of sediment for downstream reaches when the next storm runoff

event occurs. A thermograph was located in a deep pool on West Fork Stouts Creek (a watershed adjacent to JDC) in water year 1994. In 1995, a new location was chosen because the pool had filled in with sediment, due to a January 5-year flow event. Sediment will cover important spawning beds, lower the concentration of intergravel dissolved oxygen, and lessen pool depth, which is critical during summer low flows when fish need a thermal refuge.

There are 325 miles of road (all surfaces) and 172 stream crossings on BLM administered land in the watershed. These numbers were derived from GIS road and stream inventories. The table below lists road miles, road densities, and stream crossing densities. Warm rain-on-snow events and storm runoff is intercepted by compacted roads and their ditches and becomes surface flow, instead of moving as shallow baseflow. The drainage efficiency of the watershed is increased causing earlier and sharper peaks in the hydrograph (flow versus time). A study by Wemple focused on the hydrologic interaction between roads (ditches) with stream networks, and their contribution to peak flows. The study points out that roads (ditches) might have extended the stream network by as much as 40% during peak flow events. A USGS study found that mean annual flood varies with stream density in the equation Q/(mi.)2 = 1.3 (D)2, where Q is flow and D is drainage density. By applying the 40% increase in drainage density (Wemple's study) to the equation, flow would almost double in size (using an average figure from their work). Wemple found these results in the study of two watersheds where the road density was only **1.61 mi./(mi.)2.**

Table 4: Road and Stream Crossing Densities in the John Days Coffee WAU

Watershed	Road Miles	% in WAU	# Stream Crossings ($mi.^2$)	Road Densities ($mi./mi.^2$)
Days Creek	142	43	1.6	4.12
Coffee Creek	103	32	1.2	4.29
St. John's	80	25	2.0	4.63

The table shows road densities approximately three times the road density in the study. High densities of roads and stream crossings in this watershed poses greater risks to sediment inputs into the channel (see water quality). Since each drainage has relatively high densities, opportunities to improve stream crossing areas and road drainage, and reducing channel extension should be focused in Days Creek, Coffee Creek, and finally St. John's. The priority for drainages is based upon fish passage, acres of aquatic habitat, and perceived sediment concerns. An objective of decreasing road densities, especially native surface roads near stream channels, should be strived for to reduce sediment inputs.

Stream Temperature and Summer Low Flows

The high summer stream temperatures in the watershed are attributable to a large extent to low flow conditions. There is less volume of water to heat per unit area of stream in the summer months (June - September). Low summer flows and increased stream temperature leads to increased plant growth, increases in fecal bacteria, decreases in dissolved oxygen, and

increases in pH in the watershed (see water quality section). Many of the aforementioned water quality standards are exceeded for extended periods of time, which negatively effects beneficial uses. The Umpqua Basin water temperature standard of 58 degrees Fahrenheit, which is identified by DEQ in the Oregon Administrative Rules, Chapter 340, is exceeded for extended periods of time during the summer. The purpose of the standard is to protect the aquatic habitat and beneficial uses, and does not allow measurable temperature increases due to forest management activities.

A Days Creek Gaging Station (No. 14308685) above May Creek has been monitoring stream temperature since 1984. The data at this station shows stream temperatures frequently, and for extended periods, exceeds the basin standard. Average maximum stream temperatures exceed the basin standard for the entire summer, and goes dry from late July until September for the period of record. The period of record shows Water Years 1986, 1987, 1992, and 1994 as having warmer temperatures than normal. Stream temperature monitoring was also done in Coffee Creek (T29S R02W Sec 31) in 1992 and 1994. The average seven-day maximum for both years was 64 degrees Fahrenheit as shown in the table below.

Table 5: Coffee Creek - Maximum Stream Temperatures

Stream/Water Year	Max. Temp. Degrees F	Dates	7-Day Ave. Daily Max.	Dates
Coffee Creek(92)	64	08/15	64	08/13-08/19
Coffee Creek(94)	66	07/21	64	07/21-07/27

The record at Days Creek also shows that there is zero streamflow for extended periods in late July, August, and September. For example, in 1992 there were 72 days of zero flow. In a more normal year (1990), there were 9 days of zero flow at the gaging station. Low flows and increased stream temperature will stress the aquatic habitat and limit fish migration to more favorable habitat (see Fisheries section).

The size and density of riparian vegetation and the roughness in the channel can have a profound impact on stream temperature. Holaday (1992) studied water temperature at the mouth of Canton Creek from 1969 to 1990 and discovered a decreasing trend in maximum summer water temperature. He associated the decreasing trend to recovering riparian vegetation. A review of ODFW Aquatic Inventory Reports indicates a relationship between the percentage of open sky and the size, density, and crown closure of riparian vegetation. Those stream reaches surrounded by mature timber will tend to have cooler stream temperatures as shown by the two ("warm") years of data on Coffee Creek (see table above). It should be noted that many years of temperature data is needed to identify trends.

Streamflow

Forest harvest, road building, and other forest management activities can result in changes in the volume and timing of runoff. Changes in the size of peak flows and discharge at low flows are not considered water quality parameters, but can have an effect on water quality. Peakflows in the winter months affect channel stability, turbidity and suspended sediment, and overall aquatic habitat condition. Summer low (zero) flow has influenced maximum stream

temperatures, and ultimately the aquatic habitat condition in the South Umpqua basin. The 1994 water quality status summary for the Umpqua Basin (Oregon 305b Report) identifies Aquatic life and aesthetic beneficial uses as "not supported" during the summer. The "not supported" designation indicates that criteria for one or more water quality parameters were exceeded 25% of the time.

A Days Creek gaging station (No. 14308685) operated by Douglas County is located 7 miles Northeast of Days Creek and below May Creek. Flood and low flow frequency analysis have not been done on this station, but a review of streamflow records from 1985 through 1993 indicates two peak flows occurring on 2/23/86 and 1/10/89 with magnitudes of 427 cubic feet per second (cfs) and 1180 cfs respectively. The Days Creek drainage area (above May Creek) is 9.75 square miles and predominately BLM land. The average peak flow per unit area in 1986 was 44 cubic feet per square mile (cfsm) and in 1989 was 121 cfsm. There is no discharge data for St. John's or Coffee Creeks, however if we assume the flow per unit area is the same for the whole watershed, recurrence intervals can be derived by utilizing discharge data from other gaging stations. A USGS gaging station on the South Umpqua above Days Creek, OR (No. 14308600), includes a drainage area of 641 square miles. According to the Statistical Summaries of Streamflow Data of Oregon, 44 cfsm would have a recurrence interval of 4 years. A flow per unit area of 121 cfsm would have a recurrence interval of greater than a 10-year flood event.

The Canton Creek (54.6 square miles) and South Fork Smith River (13.21 square miles) watersheds experienced peak flows of 7,670 cfs and 1,070 cfs respectively on January 10, 1989, and the recurrence intervals for these two floods were 5 and 3.5 years. The Canton Creek watershed appears to drain runoff per unit area more efficiently as reflected in the average peak flow per area of 139 cfsm compared to 121 cfsm for Days Creek and 81 cfsm for South Fork Smith River. The mechanisms that produced these peak flows probably differ dramatically based on precipitation, geology, and percentage of land in the transient snow zone.

Large Woody Debris

Large Woody Debris (LWD) that is well-distributed and occurs frequently in the stream, interacts with pools in the channel over time through a wide range of flows to create a diversity of aquatic habitat types. Large Woody Debris is one of the most important sources of habitat and cover for fish populations in streams (MacDonald et al. 1991).
There are relationships that exist between LWD, habitat complexity, and salmonid production (Bisson and Sedell 1984, and Bisson et al. 1987). Reeves et al. 1993 noted that greater numbers of LWD pieces were found in basins with lower levels of timber harvest and that the level of harvest was strongly correlated with community diversity.

Large Woody Debris is a major component of channel form in smaller streams, and smaller streams usually contain more wood than larger systems (Bilby and Ward 1987). This phenomenon is due to the ability of larger systems to flush LWD downstream. It influences channel meandering, bank stability, variability in channel width, and affect the form and stability of gravel bars. A close look at Pfankuch surveys currently being done in the watershed will show changes in channel morphology due to flooding, debris torrents, and

timber harvest. LWD in the upper stream reaches slows the timing and energy associated with peak flows, and increases sediment storage and local hydraulic variability. The Record of Decision Standards and Guidelines and Best Management Practices calls for the natural recruitment of LWD to the upper stream reaches in stands 80 years old and greater (or trees greater than 20" dbh) in the watershed. The recruitment of LWD is equally important in aquatic habitats where fish migration occurs (see fisheries). Large Woody Debris is a limiting factor to the aquatic and hydraulic components of this watershed.

A review of Oregon Department of Fish and Wildlife (ODFW) Aquatic Inventory Reports notes a lack of riparian conifers greater than 50 cm (20") and/or an abundance of hardwoods in the lower reaches of streams. Three main streams, Wood Creek, Fate Creek, and Corn Creek are of particular concern, because the aforementioned scenario exists in the upper reaches. However, higher densities of second growth and old growth timber were found in the upper reaches of Days and Coffee Creeks, where most of the land ownership is BLM.

SPECIES AND HABITATS

Fisheries

Tier 1 Key Watersheds were selected to conserve anadromous salmonids and should be given highest priority for watershed restoration (ROD B-19). Key Watersheds were designated to act as anchors for the potential recovery of depressed or at-risk anadromous and resident fish stocks by maintaining high quality aquatic habitat and recovering degraded aquatic habitat (ROD B-18).

Historical Fish Use in South Umpqua Basin

The South Fork of the Umpqua River historically supported healthy populations of resident and anadromous salmonid fishes. A 1937 survey conducted by the Umpqua National Forest reported that salmon, steelhead, and cutthroat trout were abundant throughout many reaches of the river and its' tributaries (Roth 1937). Excellent fishing opportunities for resident trout and anadromous salmon and trout historically existed within the South Umpqua River (Roth 1937). The historical condition of the riparian zone along the South Umpqua River favored conditions typical of old-growth forests found in the Pacific Northwest. Roth noted the shade component that existed along the stream reaches surveyed. The majority of the stream reaches surveyed were "arboreal" in nature, meaning "tall timber along the banks, shading most of the stream" (Roth 1937). The river and its' tributaries were well shaded by the canopy closure associated with mature trees. Streambanks were provided protection by the massive root systems of these trees.

Since the 1937 survey was conducted, many changes have occurred within the South Umpqua Basin and in the stream reaches surveyed by Roth. A comparative study was conducted in all of the stream reaches surveyed for the 1937 report by the Umpqua National Forest during the summer low-flow period between 1989 and 1993. The results of the study show that of the 31 segments of stream surveyed, 22 stream segments were significantly different than in 1937. There were 19 of the stream segments that became significantly wider while the remaining three stream segments were significantly narrower. Of the eight streams surveyed

within designated wilderness areas, only one stream channel appeared to have increased in width since 1937. In contrast, 13 of 14 stream segments located in timber harvest emphasis areas were significantly wider than in 1937.

The cause for this stream widening likely resulted from increased peak flows. Peak flows typically result from removal of vegetation (tree canopy) and the increase in compacted area within a watershed, especially within the transient snow zone (Meehan 1991). Peak flows can introduce sediment into the channel from upslope and upstream and can also simplify the channel by rearrangement of instream structure. Excessive sediment delivery to streams usually changes stream channel characteristics and channel configuration. These changes in the stream channel normally result in decreasing the depth and the number of pool habitats and reduces the space available for rearing fish (Meehan 1991). The results from the USFS study substantiate the changes in low-flow channel widths that have occurred within the South Umpqua Basin since 1937 (Dose 1994). Land management activities (road construction and timber harvest) may have contributed to the changes in the channel characteristics and it may be that these changes in channel condition has resulted in the observed decline of three of the four anadromous salmonid stocks occurring in the basin (Dose 1994). [For more information on peak flows and the associated effects of these flows on stream morphology, see the Hydrologist's report.]

Winter steelhead and resident rainbow trout (Oncorhynchus mykiss), fall and spring chinook salmon (Oncorhynchus tshawytscha), coho salmon (Oncorhynchus kisutch) and sea-run cutthroat and resident cutthroat trout (Oncorhynchus clarki) have been documented utilizing the JDC WAU. Over the last 150 years, salmonids have had to survive dramatic changes in the environment where they evolved. The character of streams and rivers in the Pacific Northwest have been altered through European settlement, by urban and industrial development, and by land management practices. Modifications in the landscape and waters of the South Umpqua Basin, beginning with the first settlers, have made this river less habitable for salmonid species (Nehlsen 1994).
The South Umpqua River once supported abundant populations of chinook and coho salmon, steelhead and cutthroat trout. These species survived in spite of the naturally low streamflows and warm water temperatures that occurred historically within this watershed (Nehlsen 1994). Currently, the status of salmonid populations throughout the Pacific Northwest is declining. In 1991 a status report was written and a total of 214 native, naturally spawning stocks were identified as vulnerable and at-risk of extinction (Nehlsen 1991). According to this 1991 report, within the South Umpqua River, one salmonid stock is considered extinct, two stocks of salmonids are at-risk of extinction, and two stocks were not considered at-risk. The following information discusses the historic and present status of these species.

Historically steelhead runs in the South Umpqua River were strongest in the winter (Roth 1937). Currently, winter steelhead are considered to be the most abundant anadromous salmonid in the South Umpqua (Nehlsen 1994). In 1937 Roth reported summer steelhead above the South Umpqua Falls. Summer steelhead are now considered to be extinct (Nehlsen 1991).

Roth (1937) reported the principal run of chinook was in the late spring and summer.

Presently, spring chinook runs are considered to be depressed by ODFW. Nehlsen (1991) reported the spring chinook run at high risk of extinction. Fall chinook are considered to be healthy by ODFW (Nehlsen 1994).

Coho salmon were considered abundant in the South Umpqua in 1972 by the Oregon State Game Commission (1972). An estimated 4000 fish spawned in the basin with the majority of these fish (1450) spawning within Cow Creek. Presently, the coho salmon of the South Umpqua are suffering the same declines as other coastal stocks. These declines are potentially due to several factors, including the degradation of their habitats, the effects of extensive hatchery releases, and overfishing (Nehlsen 1994). Based on the 1937 survey, no coho salmon were sampled within the survey area (i.e. upper stream reaches of the South Umpqua River). A subsequent study conducted by Roper and Scarnecchia during the summer of 1989 in Jackson Creek, a major tributary to the South Umpqua River, documented common presence of coho salmon within this tributary (Roper and Scarnecchia 1994). The documentation of coho salmon utilizing Jackson Creek qualifies this species existence in the upper reaches of the South Umpqua Basin. Coho salmon have been observed and sampled within the JDC WAU as well.

Sea-run cutthroat are assumed to be depressed from historic levels. The information provided in the 1937 Roth report noted cutthroat trout were common and/or abundant throughout the stream segments surveyed in the Upper South Umpqua Basin. There are limited historical records on cutthroat population size within the South Umpqua River.

The assumption that sea-run cutthroat trout abundance is currently below historic levels throughout the Umpqua Basin, including the South Umpqua River and its' tributaries, has been based upon the information provided by the fish counting station at Winchester Dam on the North Umpqua River. Between the years of 1947 and 1957 the North Umpqua boasted runs of sea-run cutthroat trout averaging approximately 900 fish/year. The highest number return of 1800 fish occurred in 1954 and the lowest return for the ten year period was 450 fish in 1949. In the late 1950's the sea-run cutthroat trout returns declined drastically.

The stocking of Alsea River cutthroat trout into the Umpqua system began in 1961 and was continued until the late 1970's. The stocking of this genetically distinct stock of trout into the Umpqua system has apparently led to compounding the problem for the sea-run cutthroat trout native to the Umpqua River Basin. Sea-run cutthroat trout returns have been extremely low since discontinuing the hatchery releases in the late 1970's. The levels of returns resemble prehatchery release conditions of the late 1950's, with an average return of <100 fish/year (ODFW 1994 - overhead packet). In 1992, no sea-run cutthroat returned to the North Umpqua. In subsequent years, sea-run cutthroat trout numbers have been a total of 29 fish in 1993, 1 fish in 1994, and 48 fish to date in 1995.

According to the data available, the South Umpqua appears to have supported a larger run of sea-run cutthroat trout than did the North Umpqua. In 1972, a total of 10,000 sea-run cutthroat trout were estimated within the South Umpqua River. Sea-run cutthroat trout populations seemed to have the highest occurrence in those streams occupied by and accessible to coho salmon (Oregon State Game Commission 1972). Today, these fish are limited to the upper portion of the mainstem South Umpqua River and Cow Creek, one of the

major tributaries to the South Umpqua River. Warm water temperatures, lack of over-summering pool habitats, and low flows have precluded their use of the lower stream reaches in the basin (Nehlsen 1994).

Presently, two species of salmonids have been proposed for listing under the Endangered Species Act of 1973, as amended. The Umpqua Basin cutthroat trout has been proposed as an endangered species and the coastal coho salmon has been proposed as a threatened species under the ESA. Two fish species, the Pacific lamprey and the Umpqua chub, are on the Federal Candidate list. All of these species have been documented within the South Umpqua River.

Table 6: Stream Inventory Summary for John Days Coffee WAU

Stream	Total Miles WAU	Total BLM Miles	Total Miles Anadromous	BLM Miles Anadromous	Total Miles Resident	BLM Miles Resident
Days Creek Watershed	202.1	64				
Days Creek			13.3	4.2	14.0	5.3
Fate Creek			0.4	♦0.0	*n/a	2.0
Wood Creek			2.1	0.0	*n/a	0.2
May Creek			n/a	n/a	n/a	n/a
★Green Gulch			n/a	0.0	n/a	0.0
St. John Watershed	115.4	37				
St John Creek			1.6	0.4	n/a	1.5
E. Fork St. John			0.0	0.0	2.0	0.7
Lavadoure Creek			n/a	n/a	1.2	0.8
Ash Creek			0.05	0.0	0.0	0.0
Hammon Creek			0.0	0.0	0.0	0.0
Bland Branch			0.0	0.0	0.0	0.0
Coffee Creek Watershed	154.9	76				
Coffee Creek			.2	0.0	11.1	8.0
Texas Gulch			0.0	0.0	1.4	0.5
Granite Creek			0.0	0.0	2.2	1.4
Ruby Creek			0.	0.0	n/a	0.0
Corn Creek			.05	0.0	n/a	1.3

n/a Not available (not sampled/surveyed - no information available).
*n/a Distribution limits end on unsurveyed private lands.
♦ Has potential to restore fish passage for anadromous and resident fishes.
★ No BLM streams tributary to this stream.

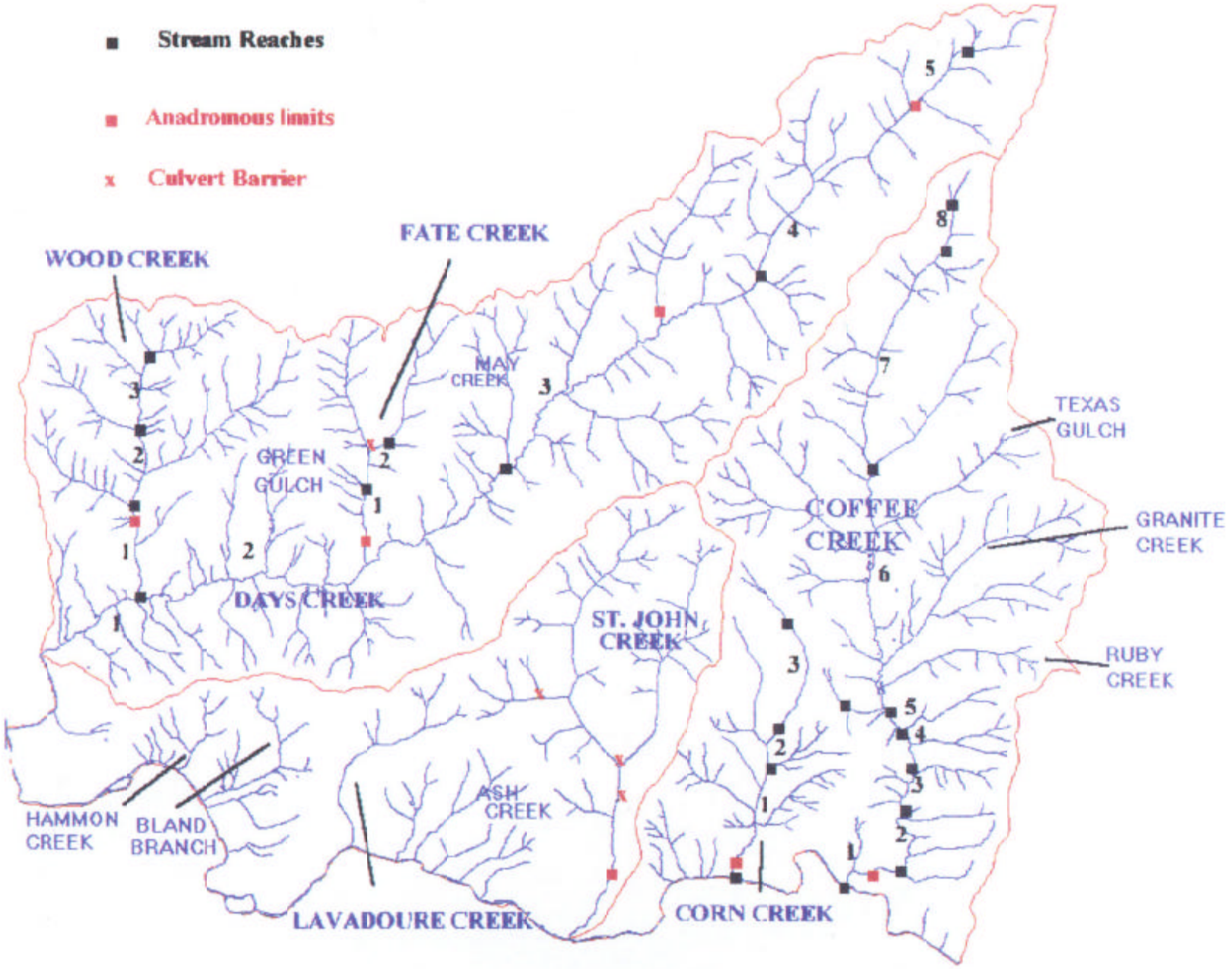
Fish distribution limits have been mapped on GIS HYD and ORD theme maps for the streams with documented barriers within the JDC WAU (See map 7). Distribution limits of anadromous and resident fish are determined by the extent at which these fish are able to migrate upstream. Natural waterfalls, log or debris jams, beaver dams, and road crossings are potential barriers to fish movement and migration.

The JDC WAU has been divided into subwatersheds within three distinctive watershed units: St. John Creek, Days Creek, and Coffee Creek. Aquatic habitat inventories have been completed for the mainstems of Days Creek, Fate Creek, Wood Creek, Corn Creek and Coffee Creek. The streams inventoried constitute 31.8 miles of the approximate 472 total stream miles within these three watershed analysis units. The inventories are used to describe the current condition of the aquatic habitat with a focus on the fish bearing stream reaches within a watershed. Streams located within the JDC WAU that have not been inventoried for aquatic habitat condition are the mainstems of St. John Creek, Lavadoure Creek, Hammon Creek, Bland Branch, Ash Creek, Granite Creek, Texas Gulch Creek, and May Creek. St. John Creek and Lavadoure Creek are planned to be inventoried during the summer of 1995. The information available on St. John Creek is in the form of personal observations and Pfankuch stream channel stability surveys that were conducted in 1992 and 1995.

Fish use and distribution information was noted in the habitat inventories. The aquatic habitat inventory is not a fish distribution/abundance survey. The habitat inventory is designed only to survey physical habitat features. The stream surveyors were informed to take note of fish use by visual observation only. Fish distribution surveys are currently underway within the Roseburg District to determine the upper limits of resident fish use. The JDC WAU will be surveyed for resident fish during the summer of 1995. The information available on the habitat condition and the distribution of fish species in the streams that have not been surveyed is in the form of personal communications and observations by ODFW and BLM biologists.

The data collected through the ODFW Aquatic Habitat Inventory can be used to analyze the components that may limit the aquatic habitat and the fishery resource from reaching their optimal functioning condition. The Habitat Benchmark Rating System is a method developed by the Umpqua Basin Biological Assessment Team (BAT team) to rank aquatic habitat conditions. The BAT team consists of fisheries biologist from the Southwest Regional Office of the ODFW, Coos Bay District BLM, Roseburg District BLM, Umpqua National Forest USFS, and Pacific Power and Light Company. This group has been designed to bring all the local fisheries biologists together to work toward addressing and resolving local questions and problems associated with the fisheries resource in the Umpqua Basin. The intention of the matrix designed by the BAT team is to provide a framework by which habitat condition can be easily and meaningfully categorized. This matrix is not intended to reflect equality of the habitat condition of each stream reach, but is intended to summarize the overall condition of the surveyed reaches. The matrix is a four category rating system consisting of an *Excellent*, *Good*, *Fair*, and *Poor* rating (see example rating form, Appendix C).

Map 7: JDC W tream Reaches



Each of the three watersheds contain differing limiting factors. Limiting factors for the fishery resource may include conditions where there has been a reduction in instream habitat structure, an increase in sedimentation, the absence of a functional riparian area, a decrease in the water quantity or quality, or the improper placement of drainage and erosion control devices associated with the forest road network.

Current Habitat Conditions

Days Creek Watershed

The overall aquatic habitat rating for the mainstem of Days Creek is *Poor*. There were six reach breaks identified within this stream (refer to stream reach map). The majority of Days Creek consists of privately owned lands and its major land uses include agriculture and timber production. The impacts from these land uses reveal themselves in the aquatic habitat data. Several habitat components absent from the mainstem of Days Creek include the number of large woody debris (LWD) pieces and the volume of LWD in reaches of fish-bearing streams, especially those occupied by anadromous fish. The lack of deep pools (>1 meter), the relatively high amounts of sediment, and the lack of potential for future recruitment of LWD into the stream reaches accessible to anadromous fish are also limiting factors on the aquatic resources in Days Creek.

The mainstem and several tributaries to Days Creek are accessible to anadromous salmonids. The major limiting factor for the mainstem of Days Creek is water quantity. Days Creek commonly dries up during the summer months. During the low flow months (generally June through September), the water of Days Creek is used to irrigate the surrounding valley's agricultural lands. The drawing of water out of the creek by irrigation pumps during the critical flow period of the year reduces the potential for over-summer survival of juvenile salmonids. Standing pools of water are often left isolated during this period of the year. Water temperature in these isolated pools is critical for the survival of salmonids. Optimal water temperatures for salmonids is 50°F to 57°F (MacDonald et al. 1991). These pools may act as thermal refugia for over-summering juvenile salmonids (Meehan 1991). The temperatures of these pools are a function of the depth of pool and the percent of riparian vegetative cover adjacent to the pool (Meehan 1991). There is no information currently available on the location of these pools. The aquatic habitat survey information data may aid in locating potential residual pool sites within the mainstem of Days Creek. The temperature regimes associated with isolated pools in Days Creek are unknown. Temperature, turbidity, and streamflow data is available from the Days Creek gaging station located in the $NW^1/_4$, $NE^1/_4$, section 33, T29S-R3W (see Hydrology). This data is used to characterize the streams' condition upstream of the gaging station.

Two major subwatersheds within the Days Creek watershed are Fate Creek and Wood Creek. Fate Creek's aquatic habitat rated as *Poor*. The majority of Fate Creek consists of privately owned lands. According to the data available in the habitat survey, riparian condition in Fate Creek is impacted by grazing and forest management activities. There were two reach breaks made within this subwatershed (refer to stream reach map). The data collected on Fate Creek identified the lack of instream LWD component. Pool area percentage was rated as excellent in both stream reaches. Pool habitat abundance relates to the amount and positioning of

LWD component within the stream channel (Meehan 1991). The stream inventory noted that the habitat in the two reaches surveyed was dominated by riffles, dammed pools, and backwater pools. Large Woody Debris does not seem to be the principal feature creating the pool habitats. There are two irrigation dams (lower and upper dams) located in reach #1 that account for the relatively high abundance of the dammed and backwater pools noted in the habitat inventory data. Beaver activity, however, has contributed to the creation and abundance of pooled areas in reach #2. These areas have been noted in the survey information. Pools are often areas of sediment deposition. The habitat data suggests that a considerable amount of silt, sand, and organics (i.e. fines) exists within the two reaches of Fate Creek. The deposition of fines causes a reduction in the pool depth within the reach over time (Meehan 1991). Fines were also of relatively high abundance within the riffle habitat units. These fines reduce the potential for gravel substrates to provide salmonids suitable spawning conditions. The intergravel spaces important for egg development and sac-fry survival are often filled by sediments and fines. There are commonly reductions in the amount of dissolved oxygen available to the eggs and sac-fry in areas of sediment deposition (MacDonald et al. 1991).

A field inspection was made on 18 July 1995 with an ODFW biologist to observe the fish passage concerns on lower Fate Creek. Streams were sampled with an electro-fish backpack shocker to determine fish presence and relative abundance of species (sp.) within Fate Creek. Fish passage barriers were noted during this field trip. The first barrier to anadromous salmonids in Fate Creek is a culvert located on county road #34 (Days Creek road). This culvert is intermittently passable to anadromous salmonids. The culvert has approximately a 1.2 meter drop at the outlet to the water surface of the culvert pool. We shocked the culvert pool and documented coho salmon, steelhead trout, cutthroat trout, sculpin sp., and dace sp. utilizing the stream reach below the culvert. The lower dam, located on private land, is approximately 4 meters in height and it backs water approximately 121 meters upstream. The dam is impassable and is the upper limit of distribution of anadromous salmonids within Fate Creek. The stream reach above the culvert and downstream of the dam when shocked revealed cutthroat trout, a few 1+ year old steelhead trout, sculpin sp., dace sp., and no coho salmon juveniles. Above the dam, cutthroat trout and sculpin sp. were found, but no anadromous fishes. The upper dam is approximately 0.9 meter in height and is located on BLM administered lands. We were unable to observe the upper dam during our field trip, but were informed by the local landowner of its location on Fate Creek. Field observations of the upper dam are needed to determine whether it is a barrier to fish passage. The inability of anadromous fishes to reach areas historically accessible within Fate Creek was evident from the results of our sampling.

Wood Creek's aquatic habitat condition was rated as *Fair*. The majority of Wood Creek consists of privately owned lands. Wood Creek is impacted primarily by forest management activities. There were four stream reach breaks within this subwatershed (refer to stream reach map). Large woody debris and an abundance of fines in the four stream reaches limits the potential of this stream to provide the adequate habitat components for the fishery resource inhabiting this stream. Survey information suggests that reaches #1 and #2 have a reasonable amount of gravel substrates available and relatively small amounts of fines associated with the riffle habitats. The availability of relatively silt-free gravel substrates provide useable spawning substrates for salmonids that utilize these stream reaches. In

contrast, the upper two reaches were documented with a high abundance of fines associated with the riffle habitat units. Thirty-four percent of the riffle habitat in reach #3 consisted of fines. The fines located in the upper two reaches constitute a potential risk for degrading the downstream habitat conditions in the future.
The major limiting factors for the fisheries resource in Fate Creek and Wood Creek are access for the anadromous fishery resource and the relatively high amount of fines throughout most stream reaches [refer to Table 6 for fish bearing stream lengths]. The administrative ability of the BLM to rehabilitate the anadromous portions of Fate Creek and Wood Creek are limited because of land ownership boundaries. The riparian vegetation in Fate Creek and Wood Creek is characterized by young and second growth timber. Stream temperature data is not available for Fate Creek nor Wood Creek. The data available on riparian condition in these subwatersheds suggests that riparian conditions are improving. Water temperatures are likely to remain at current levels in the short term (i.e. next 10-15 years), but are expected to improve in the future with the current riparian reserve land allocation scheme on BLM administered lands (ROD C-30) and the Stream Protection Rules on private lands (Oregon Forest Practices Act). The potential exists for improving anadromous salmonid access into these subwatersheds.

Coffee Creek Watershed

The overall rating for the mainstem of Coffee Creek is *Poor*. There were eight stream reach breaks identified in this survey (refer to stream reach map 7). Reach #6 was not surveyed due to restricted access. Fifty-three percent of the Coffee Creek watershed consists of BLM administered lands. The survey data collected on the mainstem of Coffee Creek suggests a lack in the volume of LWD and the number of LWD pieces in the stream reaches. Substrate was dominated primarily by bedrock and secondarily by gravel and cobble. Sand, silt, and organics do not appear to be a dominant characteristic within the reaches surveyed. The low volume and number of the LWD pieces instream suggests that this stream lacks the roughness features necessary to retain substrates. Pools >1 meter in depth were located throughout the stream with the majority occurring in reaches #1-5. The depth of pool is an important parameter in identifying potential areas where fish may rear, forage, and over-summer.

The limiting factors for the fisheries resource in Coffee Creek are access for anadromous fish species, the apparent lack of LWD component in the lower reaches, and the impacts from the mining activities occurring in reach #6. The BLM administers no anadromous stream miles in Coffee Creek. The BLM does; however, manage the majority of lands above the anadromous fish limits. The barrier to the anadromy is a natural waterfall located in reach #1 [refer to Table 6 for fish bearing stream lengths]. The survey reports the majority of Coffee Creeks' riparian area is in second growth and mature timber. The recruitment of LWD component into reaches #3, 4, 5, and 8, in the near future, is relatively high. The removal of streamside vegetation can result in increased water temperatures (Meehan 1991). This may be the case within the riparian area and stream channel of reach #6 where mining activities have removed streamside and riparian vegetation. The influx of sediment from recent ground disturbance within the riparian area and the direct disturbance of stream substrates during mining activities often reduces or eliminates habitat for aquatic insects; reduces density, diversity, and population structure of aquatic insects; reduces the permeability of gravel substrates; and prevents the mixing of subsurface and surface waters (Meehan 1991). Other impacts associated with mining activities include the construction of new roads, hazardous material spills adjacent to a stream or within the stream, and the removal of the LWD component from the stream channel.

The overall aquatic habitat inventory for Corn Creek rated as *Fair*. Three stream reach breaks were made for this subwatershed (refer to stream reach map). The majority of land in Corn Creek is privately owned. The data on Corn Creek indicates a high amount of fines deposited throughout the stream reaches, a lack in the amounts and volume of LWD instream, and a low potential for recruitment of LWD component into the channel in the near future (i.e. 15-20 years). The upper reach has a high percentage of fines located in the riffle units. The risk to downstream reaches is the future potential for movement and deposition of sediment loads from upstream. The major land use within the Corn Creek subwatershed is timber production. The data available on riparian condition suggests that the majority of Corn Creeks' riparian is second growth timber. Temperature data is unavailable for Corn Creek.

The major limiting factors for the anadromous fishery resource within Corn Creek are access and the relatively high percentage of fines located in most stream reaches [refer to Table 6 for fish bearing stream lengths]. A natural barrier located less than 0.1 miles upstream of the confluence with the South Umpqua River limits the future potential for anadromous fish access into Corn Creek. The BLM has no administrative control on any portion of anadromous stream in Corn Creek. Restoration opportunities within this subwatershed should concentrate on road maintenance, renovation, and possible obliteration.

St. John Creek Watershed

The St. John watershed consists of the mainstem of St. John Creek and its' tributaries, Lavadoure Creek and its' tributaries, and other small tributaries to the mainstem of the South Umpqua River. The majority of this watershed consists of privately owned timberlands with BLM administered lands interspersed. Aquatic habitat inventories have not yet been conducted for this watershed. Personal observations suggest several limiting factors for the fishery resource within this watershed. These factors include anadromous fish passage, lack of instream LWD, and the lack of pools. Limits to the anadromy in the mainstem of St. John Creek are caused by road crossing structures. Four culverts associated with fish bearing streams were identified in the TMO's as being fish passage barriers. Three of these culverts are located in the resident fish bearing portion of St. John Creek. Historical data on anadromous limits are unknown for this creek and determining whether the anadromous barrier at the lowest road crossing in the watershed was preexisting before the road was constructed is difficult. Further analysis is needed to determine historic distribution of the anadromy within St. John Creek.

Lavadoure Creek has been impacted by forest management activities and forest fire. Personal observations of this stream identified potential limiting factors for the fishery resource. The major factors are the lack of riparian vegetation and the low potential of recruitment of LWD into this stream system in the near future (approximately 100 years). Salvage sales within this subwatershed removed LWD components and the potential for these components to reach the stream. The aquatic habitat within this subwatershed will likely not benefit in the short term from these salvage activities. The stream has been negatively impacted from the introduction of sediments. The reductions in vegetative cover from past timber harvest activities and the forest fire are assumed to be the major contributors toward the sediment loading into Lavadoure Creek.

WILDLIFE : Historical Overview of Species of Concern

American Bald Eagle and Peregrine Falcon

Historic distribution of the bald eagle included the entire northwestern portion of the United States (California, Oregon, Washington), Alaska. and western Canada. Declines in bald eagle populations probably started in the 19th century but noticeable declines in numbers did not start until the 1940s (USDI 1986).

Throughout the North American range, drastic declines in bald eagle numbers and reproduction occurred between 1947 and the 1970s. In many places, the bald eagle disappeared from the known breeding range. The reason for this decline was the use and impact of organochloride pesticides (DDT) on the quality of egg shells produced by the eagles (USDI 1986). This decline was likely present in Roseburg District in light of the use of DDT in much of western Oregon from 1945 to the 1970s (Henny 1991). Other causes of eagle decline included shooting, and habitat deterioration (Anthony et al. 1983). Historically, removal of old growth forest in the vicinity of major water systems (e.g. South Umpqua River) contributed to habitat deterioration through loss of bald eagle nesting, feeding, and roosting habitat.

Data collected by Fierstine and Anthony (1978) indicated no bald eagle nest sites were present in the South Umpqua Planning Unit (SUPU), an area that included the current boundary of the JDC watershed. In 1979, the Roseburg District Biologist believed the SDMU was "never a high density nesting area, but prior to timber harvest activities adjacent to the South Umpqua River, the carrying capacity in the planning unit could have been as high as four nesting pairs" (SUPU 1979). Current information collected from yearly inventories (1971-1994) of known bald eagle sites by Isaacs and Anthony (1994) of Oregon State University does not list any sites, nests, or territories within or in the vicinity of the South Umpqua River in the southern boundary of the JDC watershed. This portion of the South Umpqua River is considered possible wintering habitat but no data is available to support this. Sporadic observations and reports of bald eagles in this area may reflect migrating individuals.

Peregrine falcon populations in the Pacific Northwest also declined as a result of the increase use of organochloride pesticides, shooting, use of other chemicals (avicides: organophosphates) to kill other bird species considered pest and habitat disturbance (loss of wetlands, loss of fresh water marsh environments in interior valleys, and increased rural development) (Aulman 1991).

In Oregon, peregrine falcons were a "common breeding resident" along the Pacific coastline and were present in many areas including the southwestern portion of Oregon (Haight 1991). Although the peregrine falcon has been documented in the South Douglas Resource Area (documented sightings) no nest locations are known within the JDC watershed area.

The Northern Spotted Owl

The geographic range of the northern spotted owl has not changed much from its historic boundaries. However habitat available and historically used by spotted owls has changed to the point that owl population numbers have declined and distribution rearranged These changes are considered a result of habitat alteration, and removal by timber harvest, fire, and

land development (Thomas et al. 1990). An extensive review of the history and spotted owl population changes is presented in the ISC report of 1990 and will not be covered here.

Columbian White-tailed Deer and Marbled Murrelet

The JDC watershed is located outside of the current and historic distribution range of the Columbian white-tailed deer and outside of the suitable habitat range for the marbled murrelet (USFWS 1983; USDA and USDI FEIS 1994, USDI 1992b).

Big Game Species (Elk and Deer)

Historically the occupied range of Roosevelt Elk extended from the summit of the Cascade Mountains to the Oregon coast. Elk population estimates in 1938 was at 7000 in Oregon (Graf 1943). Numbers and distribution of elk were altered as people settled in the region. Over time, the elk habitat areas shifted from historic distribution to "concentrated population centers which occur as islands across forested lands of varying seral stages" (SUPU 1979). Information about the historic distribution of elk within the JDC watershed and the equivalent Dixon management unit (set by ODFW) is not available. Given the increase number of people into the area, road construction, home construction, etc, it is suspected that elk numbers also declined as reported in other parts of the region.

Like elk, the black-tailed deer was present throughout Oregon. During the increased logging that occurred after WWII, suitable young seral age stands (less than 20 years old) were abundant and black-tailed deer populations increased to the point that liberal hunting seasons were permitted. Overall black-tailed deer numbers remained stable through the late 1970s in the SUPU (1979). Creation of early seral stands as a result of timber harvest benefited deer and elk as a byproduct, not as part of a specific management plan for these game species.

A variety of wildlife species inhabit the different age classes present in the watershed. In all, the various vegetation age classes present provide habitat to over 200 vertebrate species and thousands of invertebrate species. Of these species, 38 species are of special concern because they are federally threatened (FT), endangered (FE), candidate (FC), Bureau sensitive (BS) or Bureau assessment species (BS) (see Appendix A). In addition to these species, the ROD has a list of species to survey and manage for in Oregon, Washington and California (USDA and USDI FEIS Appendix J2 1994a). A list of species (from Appendix J2) that may occur in the Roseburg District (South Douglas Resource Area) is given in Appendix B. Elevations found in the watershed range from 700 TO 4200 feet above sea level.

THREATENED AND ENDANGERED SPECIES : Current Condition

Five species known to occur in the Roseburg District are legally listed as federally threatened (FT) or federally endangered (FE). These include the American Bald Eagle (Haliaeetus leucocephalus) (FT), the Marbled Murrelet (Brachyramphus marmoratus) (FT), the Northern Spotted Owl (Strix occidentalis caurina) (FT), the Peregrine Falcon (Falco peregrinus anatum) (FE), and the Columbian White-tailed Deer (Odecoilus virginianus leucurus) (FE). Three of these species; the bald eagle, the spotted owl, and the peregrine falcon are known to occur within or in the vicinity of the JDC watershed.

The Northern Spotted Owl

The northern spotted owl is found in the Pacific Northwest, from northern California to lower British Columbia in Canada. Extensive review of the biology of this species is available elsewhere (Thomas et al 1990, USDI 1992a).

In the JDC watershed, the spotted owl is known to occur in 17 areas dispersed through the watershed. Four spotted owl activity centers (AC) occur within a mile of the watershed boundary. Habitat important to the spotted owl has been identified by Roseburg District BLM biologists based on the ground knowledge, inventory description of forest stands, and known characteristics of the forest structure. These habitats have been named Habitat 1 (HB1) and Habitat 2 (HB2). Habitat 1 describes forest stands that provide nesting, foraging and resting components, and Habitat 2, is described as providing foraging and resting components but lacks nesting components. Other areas not fitting into the HB1 or HB2 category and not younger than 40 years old, are considered dispersal habitat, used by the spotted owl to move from one area to another (Thomas et al. 1990, USDI 1992a). Tables 7 and 7b give the acres of HB1 and HB2 present in the JDC watershed.

The Roseburg District has selected suitable habitat for activity centers around active spotted owl sites located as of January 1994. Fourteen ACs (1395 acres) are identified within the JDC watershed, and three core areas straddle the boundary. See Table 8 for information about the current status of use, habitat acres, occupation, and reproduction of these activity centers.

Table 7 : Spotted Owl Suitable Habitat Within The JDC WAU**

SPECIES	HABITAT 1	HABITAT 2	TOTAL
SPOTTED OWL	6480	4701	11,181
	58%	42%	100%

Table 7b: Percent Area Of Habitat 1 and 2 Related To The Total Land Area In The JDC WAU

HABITAT 1	HABITAT 2	HABITAT 1 AND 2	TOTAL AREA IN JDC
6480	4701	11,182	48,473
13.3%	9.7%	23%	100%

** See text for definition of habitat 1 & 2.

Another habitat component that can be measured is 50-11-40 acres. This number (50-11-40) refers to the amount (in acres) of forested land that is at this time in a condition where 50% is composed of 11 inch diameter trees with a minimum of 40% canopy closure. This habitat condition is considered important for dispersal habitat used by the spotted owl. Table 9 gives the acres of 50-11-40 present in the JDC watershed by the quarter townships that overlap the watershed boundary.

Table 8. Spotted Owl Activity Center Ranking Data within the JDC watershed in the South Douglas Resource Area (1995).

MSNO	YEAR SITE WAS LOCATED	LAST YEAR OF KNOWN ACTIVE PAIR (PAIR STATUS + # JUVENILES)	LAST YEAR OCCUPIED & (PAIR STATUS)	No. OF YEARS OF REPRODUCTION/ (PAIR STATUS=P) SINCE 1985	ACRES IN PROVINCE RADIUS (RADIUS IN MILES)	ACRES IN .7 MILE RADIUS	OCCUPANCY RANK	ACRES RANK	HISTORY RANK
2090B	1989	1994(P+2J)	94 (P)	1/1(3/5 overall)	607(1.2)	187	1	D	1
2090A	1992	1993(M+F)	93 (M+F)	0/2	607(1.2)	177	1	D	1
0361	1978	1994(M+F)	94 (M+F)	0/2	640(1.3)	279	1	D	2
1809	1986	1994(P+0J)	94 (P)	1/6	913(1.2)	455	1	D	1
1994	1988	1994(P+2J)	94 (P)	5/6	1536(1.2)	762	1	A	1
1995	1988	1994(P+0J)	94 (P)	2/6	876(1.2)	354	1	D	1
1985A	1990	1994(P+0J)	94 (P)	1/6	369(1.2)	218	1	D	1
2293	1990	1994(P+2J)	94 (P)	1/2	1862(1.2)	769	1	A	1
2197	1990	1994(P+0J)	94 (P)	2/4	543(1.2)	389	1	D	1
1999	1988	1993(M+F)	94 (M+F)	0/3	1957(1.2)	791	2	A	1
0295	1977	1993(M)	94 (M)	2/3	1573(1.2)	602	1	A	2
1996	1988	1992(M)	94 (M)	1/3	1081(1.2)	363	2	B	1
1984	1987	1991(P+0J)	91 (P)	1/2	588(1.3)	185	3	A	3
1810	1986	1991(M+F)	94 (M+F)	0/4	547(1.2)	300	2	D	2
1930	1987	1990(F)	93 (F)	1/3	1800(1.2)	689	2	A	2
2294	1990	1991(P)	91 (P)	0/1	535(1.3)	235	3	D	3
2093	1988	1989(M+F)	89 (M+F)	0/0	727(1.3)	313	3	D	3

Table 3 Definitions

OCCUPANCY RANK- 1: Sites with this ranking have current occupancy and have been occupied by a single or pair for the last 3 years; 2: Sites with this ranking have been occupied in the past, show sporadic occupancy by a single owl or an owl pair, may be currently occupied; 3: Sites with this ranking have not been occupied during the last 3 years.

LAST YEAR OF KNOWN ACTIVE PAIR- Gives the year, pair status and young produced; NP: site has not had a pair

ACRES RANK- A: Regarding suitable spotted owl habitat, these sites have greater than 1000 acres in the provincial radius and greater than 500 acres within a .7 mile radius; B: Greater than 1000 acres in the provincial radius but less than 500 acres within a .7 mile radius ; C: Less than 1000 acres in the provincial radius and greater than 500 acres in the .7 mile radius; D: Less than 1000 acres in the provincial radius and less than 500 acres in the .7 mile radius.

HISTORY RANKING: This ranking includes occupancy ranking, reproduction data, acres ranking, habitat evaluation, field experience about the site (location, quality, forest structure etc.). 1: A site considered stable due to consistant occupation by spotted owls and consistant reproduction of young ; 2: site is consistently used by spotted owls but reproduction is sporatic; 3: site shows some reproduction, occupation sporatic or no occupation.

STATUS= M: MALE; F: FEMALE; J: JUVENILE; P: PAIR STATUS; (M+F): TWO ADULT BIRDS, PAIR STATUS UNKNOWN; PU: PAIR STATUS UNDETERMINED, INCOMPLETE OR NO DATA.(ND)

OVERALL: In the number of years of reproduction column, the data shown in parentheses refers to the complete record for the site number. This is used when the alternate number (i.e. 1090A) is recent and does not provide complete the history of the site.

TABLE 9: Acres Of 50-11-40 Habitat In The JDC Watershed.

QTR.	TOTAL AVAIL-ABLE	1140 ACRES	1140 AVAILABLE	1140 %
29-02-NW	4574	3014	727	66
29-02-SW	5742	4147	1276	72
29-03-SE	2215	884	0	40
29-03-SW	2328	1387	223	60
29-03-NE	2321	1301	141	56
29-04-SE	927	720	257	78
30-02-NW	2310	1453	298	63
30-02-SW	1527	875	112	57
30-03-NW	902	676	225	75
30-03-NE	2753	1744	368	63
30-03-SW	1078	464	0	43
30-03-SE	827	401	0	48
30-04-NE	931	468	3	50
TOTALS	26114	16233	3489	62

TOTAL AVAILABLE: Total forested acres including 50-11-40 acres.
1140 ACRES: Amount of 50-11-40 acres in the total forested acres.
1140 AVAILABLE: Number of acres above the 50% level of total acres available.
1140%: Percent of 50-11-40 acres in the township (1140 acres/total available).

Table 9 shows the amount of 1140 acres available per township. Another way to view this, is to look at the 1140% column; the percent shown includes the level above 50% for the township. For example in township 29-02-nw, 66% includes the 16% above the mid-mark or 727 acres is 16% of the total acres available.

The American Bald Eagle and the Peregrine Falcon

These two bird of prey species occur in the Roseburg District, but do not appear to be present within the boundary of the watershed. Yearly inventories of known bald eagle sites by Bob Anthony of Oregon State University (1992-1994) does not list any sites, nests, or territories within or in the vicinity of the watershed (South Umpqua River in the south boundary).

The peregrine falcon is known to occur in the District but surveys have not been conducted to locate this species in the watershed (as of 1994). The volcanic and granitic material that makes up the topography within the watershed, has in some places eroded to create cliffs and ledges. Many of these areas are present throughout the watershed. Surveys to inventory potential peregrine habitat in the watershed have not been done. An evaluation of the watershed north of JDC shows an area known as White Rock (a rock outcrop at 4021 feet above sea level), that has physical material and structure that qualifies the area for possible

use by peregrine falcons. An evaluation of potential peregrine habitat in the JDC watershed is ongoing and results will be available at the end of the summer (1995).

Remaining Species of Concern

The species not threatened or endangered, fall into a federal candidate, Bureau sensitive, or Bureau assessment category. Of these, 18 are federal candidate 2 species, 1 Bureau sensitive, and 14 are Bureau assessment. See Appendix A for the species that have been documented in the Roseburg District.

Although there is information about the biology and habitat requirements of these species, the population levels and current distribution for these species is not available. Many of these species require unique features (ponds, seeps, caves, talus, etc.) found throughout the landscape and associated vegetation cover. This makes evaluating presence or absence as it relates to habitat hard to do. In the JDC, the vegetation types based on age class is available but the distribution pattern and abundance of unique habitats is not available at this time. Keeping this in mind, what follows is a short discussion of the species in Appendix A and B.

The amphibian species in Appendix A (northern red-legged frog, foothill yellow-legged frog, Del Norte Salamander, Clouded salamander) use unique habitats that are often found across vegetation classes. These habitats include large down woody material talus slopes, creeks, seeps, ponds and wetlands. These features are abundant in these watersheds throughout the elevational range. These species have been documented in the District or near the District boundary and thus are expected in the JDC WAU.

An inventory of amphibians in the South Douglas Area was recently completed (Bury 1994). This inventory serves to document the extent of amphibian species in the area. Species like the spotted frog are not expected in these watersheds and was not found during the 1994 inventory. The tailed frog is likely present in the JDC. This species serve as an indicator of watershed water quality, because of its sensitivity to changes in sediment loads, and water temperature. Another species, the Cascades Frog was documented in the WAU as well as the Olympic salamanders. The data indicates that the Rhyacotriton genera (Olympic salamanders) is present in the JDC.

During the summer of 1994, a survey to identify the bat species present in the South Douglas Area was conducted under contract by Dr. Steve Cross of Southern Oregon College, Ashland, OR. Bat species use unique habitats (caves, talus, cliffs, snags, etc.) located within young or older age vegetation stands for roosting, hibernation, and maternity sites. In addition they will utilize other unique habitat (ponds, creeks, streams) for feeding. Both the special status bat species and the listed C-3 species (USDA AND USDI 1994) are present in the District and expected in the JDC WAU. Surveys to locate the general habitat, and unique habitats used by these species for breeding, roosting and feeding is needed.

Mammals like the white-footed vole, that have a geographic range that includes the Roseburg District are expected to be present in the JDC watershed. Information about the biology and life history of this species is limited (Marshall 1991). This species is associated with riparian zones, woody materials, and heavy cover. More recent information indicates association with

mature forest (Marshall 1991). No surveys have been done for this species.

Information about the Northern goshawk is readily available (Marshall 1991). However the majority of the work with this species has been done east of the Cascades. Current geographic distribution indicates that the goshawk would not be expected in the majority of the Roseburg District. However, observation records since 1984 indicate that the goshawk is present north of the expected distribution range (Sse Appendix B, map ?). In the early 1980s, two nest sites were found in the Roseburg District but neither one was located within the JDC WAU. Surveys to detect adult goshawks and/or goshawk nesting sites have not been conducted in the South Douglas Area and the JDC (through 1994). Surveys for goshawks have started in these watersheds and results would be available at the end of the summer (1995).

The JDC WAU is known to support bird of prey populations common to the region but local surveys have not been conducted. These raptor species are expected to be present given the habitat present throughout the District. Some information is available about ospreys. This watershed has as a south boundary the South Umpqua River. The river provides an ideal habitat for ospreys where nesting substrate is present on BLM or private land. Osprey surveys have been conducted along this section of the river where three nest are currently active.

Neotropical Species

Oregon has over 169 bird species that are considered neotropical migrants; that is, these birds breed north of Mexico and migrate south to Mexico, Central America, and South America to spend the winter. Of these species, over 25 species have been documented to be declining in numbers (Sharp 1990). During 1993 and 1994 the South Douglas Resource Area conducted neotropical bird capture, banding, and habitat evaluation. However none of this work was done in the higher altitude areas common in the JDC watershed. The habitat types and age classes are likely being used by neotropical species during migration and the breeding season. No information is available about the local neotropical population numbers in the JDC.

Big Game Species (Elk and Deer)

Exact numbers on the Roosevelt Elk and black-tailed deer populations in the JDC WAU are not available (Personal communication from ODFW). Both species are present and use similar habitats. Areas where elk and deer forage for food includes the open areas where the vegetation includes grass-forb, shrubs, open sapling communities. Both species use a range of vegetation age classes for hiding. This hiding component is provided by large shrub, open sapling, closed sapling, and mature or old growth forest components (Brown 1985).

The JDC WAU includes part of two elk management areas (Deadman Mt. and Myrtle Creek) identified in the Roseburg District Record of Decision (1995) and the Proposed Roseburg District Resource Management Plan/EIS (1994). The Myrtle Creek elk management area covers 31,555 acres of the JDC WAU, while the Deadman Mountain elk management area covers 7880 acres. These management areas have not been surveyed to determine the population numbers of elk or deer. However, an evaluation of the forage, cover, and road

density in these management areas was conducted (RMP 1994). This evaluation showed that road density is 3.91 mi/mi² (miles per square mile), forage available is .44 (1.0 optimum), and cover is .26 (1.0 optimum) (Wisdom et al 1986) and is a general guide for habitat components important to elk. In general these same components area also important to Columbian Black-tailed deer. To compare, the JDC boundary that overlaps the management areas has 4.29 road mi/mi².

PLANTS

Surveys have been conducted for Special Status Plants on portions of the John Days Coffee WAU (Plant Atlas). There are many additional suspected "Survey and Manage" species that survey protocols have not been developed for. For some suspected species, the survey would start at the watershed analysis level with identification of likely species locations based on habitat.

The following is a list of Special Status Plants that have been documented in the WAU:

Astragalus umbraticus: Assessment Species: **Days Creek Watershed, Coffee Creek Watershed**
Woodland milk vetch grows in open woods at low to mid elevation from Southwest Oregon to Northwest California.

Dichelostemma ida-maia: Tracking Species: **Days Creek Watershed**
The firecracker plant grows in open woods, grassy hillsides, and roadsides from Douglas County, Oregon, south through the Siskiyous into California where it is more common.

No Special Status Plants have been documented in the St. John watershed.

The following is a list of Special Status Species suspected in the WAU, based on general habitat characteristics:

Aster vialis; FC2; "Survey and Manage" Species
Aster vialis is a rare locally endemic taxon known only from Lane, Linn and Douglas Counties, in Oregon. It occurs primarily along ridges between Eugene and Roseburg.

Lupinus sulphureus var kincaidii ; FC2
This is one of three varieties of Lupinus sulphureus found in Oregon. It is known in the Willamette Valley and south into Douglas County, with a disjunct population reported in Lewis County ,Washington. (Eastman.,1990)

Cypripedium montanum; Tracking, "Survey and Manage" Species
Cypripedium montanum populations are small and scattered; less than 20 are extant west of the Cascades. Small populations may reflect the slow establishment and growth rate of this species. Cypripedium montanum seems to persist in areas which have been burned. The species ranges from Southern Alaska, British Columbia, south to Montana, Idaho, Wyoming, Oregon and California.

Noxious weeds have been identified within the Days Creek Watershed. The encroachment of noxious weeds have been steadily reducing natural resource values. Invasion of noxious weeds is known to dramatically affect native plant communities reducing their abundance and distribution(Bedunah, 1992).

The intent of an integrated weed management program is to implement a strategy that will facilitate restoration and maintenance of desirable plant communities and healthy ecosystems. Currently the Bureau of Land Management has an agreement with Oregon Department of Agriculture(ODA) where locations of noxious weed invasions is identified and monitored by BLM and control measures are administered by ODA.

The following goals are important in the implementation of integrated weed management:

:Inventory by species
:Identification of potential invaders
:Monitoring
:Prioritization of noxious weed species
:Habitat management and restoration

The following (Target) noxious weed has been documented in the Days Creek Watershed:

:Yellow Starthistle(Centaurea solstitialis) has been designated by ODA as a Target weed species. Because of the economic threat to the state of Oregon, action against these weeds will receive priority. Yellow Starthistle is native to dry open habitats in Southern Europe. A single Yellow Starthistle plant can produce up to 150,000 seeds under optimum conditions. Invasions of Yellow strarthistle will be documented for control by ODA. The area will be monitored by BLM for resurgence.

HUMAN USES

The JDC WAU has several prevalent uses important to those living in these watersheds, as well as in the surrounding communities.

Timber

Production of forest products is an important human use. The JDC WAU contains approximately 23000 acres of private land capable of forest production, some of which is currently being harvested. BLM administered lands contain tracts of timber, potentially available for harvest as well. These activities are important to the local economy, providing both jobs and revenue to local inhabitants.

Minerals

Mineral production is another human use within the WAU. The area has high and moderate potential areas for gold, silver, copper, mercury, lead/zinc, and chromium/nickel deposits. Gold is being produced today from placer mines in the Coffee Creek drainage. Mercury has been produced from the watershed in the past. It is expected that production of gold from placer deposits will continue.
The construction of roads within the JDC has led to the development and mining of rock quarries to provide surfacing. Decomposed granite, shale, and sandstone are common, with

few viable rock sources available. Of the nine quarry existing in the WAU, two are located on private land, and seven are on BLM administered lands. Most of the quarries have been exhausted of any real quantity of useable rock. Reclamation plans are being developed for five of the quarries on BLM administered lands, including the Bland Mountain Community Pit. The remaining quarries on BLM land are the Daybreak and Lavadoure Creek quarries, both community pits. Both quarries contain and estimated 10000 cubic yards (each) of acceptable crushing rock. Mining and reclamation plans have not been developed for these pits. Surfacing rock will continue to be in demand in these watersheds, and will be a major tool used to reduce sediment and soil runoff through upgrading roads.

Agriculture

There are approximately 5100 acres of agriculture/farm land in the WAU. These lands contain pastures for grazing cattle and sheep, fields for grain production, and farmlands for seasonal crops of fruits and vegetables.

Recreation

These watersheds fall within the South Douglas Extensive Recreation Management Area. Recreation is mainly unstructured and dispersed, where limited needs or responsibilities require minimal recreation investment. These areas, which constitute the bulk of public land, give recreational visitors the freedom of choice with minimal regulatory constraints. Recreation in these watersheds is mainly in the form of dispersed casual use. Dispersed forms of recreation commonly observed in this area include scenic driving, hunting, photography, picnicking, camping, target shooting, and gathering (berries, flowers, mushrooms, greens, rocks, etc.).

V. Interpretation

VEGETATIVE CONDITION

Although private lands are a major component of this WAU, the focus of interpretation will be on BLM administered lands. Private lands are in a constant state of change, and although we can assume that those stands in the 30 to 70 age classes will continue to be harvested, we cannot predict the timing or amount of harvest.

BLM administered lands available for intensive forest management are basically those lands outside Riparian Reserves and other outs. Based on the age class of the various strands, they would be available for the following treatments:

Age Class: < 10 years
Treatments prescribed for this age class would be those designed to promote the survival and establishment of conifers and other vegetation by reducing competition from undesired plant species and protecting them from natural hazards. Maintenance and protection actions would include mulching, cutting or pulling unwanted species, grazing, herbicide application, tubing/netting, shading and trapping.

Age Class: 10-20 years
Treatments prescribed for this aggregation of age classes would involve precommercial thinning and release that would be designed to control stand density, maintain stand vigor and

influence species dominance. Fertilization would be employed after thinning to augment the supply of soil nutrients, further enhancing stand growth.

Age Class: 30-70 years
Treatments prescribed for this age class would involve pruning and commercial thinning. These activities would enhance wood quality through the production of clear wood, increase timber yields through the harvest of merchantable trees that would otherwise be lost to mortality and improve the growth rates of residual trees. Timing of thinning activity would depend on stand density, minimum average diameter for an economic entry, site quality and previous silvicultural treatments, but would not likely occur before age 35. Thinning in Riparian Reserves could occur with the specific objective of hastening the restoration of large conifers to areas where they are currently deficient.

Age Class: 80-200+ years
Treatments prescribed for this aggregation of age classes would involve commercial thinning, density management, regeneration harvest or all of the above, depending on Land Use Allocation (General Forest Management Area vs. Connectivity). For GFMA, regeneration harvest with a retention of 6-8 green conifers per acre > 20" diameter would be programmed at culmination of mean annual increment (CMAI), which is 80-110 years on the average for this area. For Connectivity, commercial thinning and density management would be the priority harvest in stands < 120 years old. Regeneration harvest resembling a shelterwood cut with a retention of 12-16 green conifers per acre > 20" diameter would be programmed using a 150 year rotation.

Overall, the JDC WAU contains 11,516 acres of forested BLM lands in age classes 80 and greater (all land use allocations). Proportionally, Coffee Creek contains the highest percentage of mature stands, followed by Days Creek, and St. John Creek. This total acreage corresponds closely with the acreage of spotted owl habitat 1 and 2 found within the WAU. A large continuous block of mature stands can be found running north-south in the headwaters of the Days Creek and Coffee Creek watersheds. This is also the area of the WAU that contains portions of the Myrtle Creek and Deadman Mountain elk management areas as identified in the Roseburg District RMP (RMP pg. 39).

By comparing the percentage of Riparian Reserve acres in older age classes for each watershed, it is possible to gain a general idea of how well they are currently meeting the objectives established for Riparian Reserves. Coffee Creek watershed has the greatest percentage (64%) of stands age class 80 years and older within Riparian Reserves. Days Creek watershed has 54% of the area in Riparian Reserves older than age class 80, and St. John watershed contains 40% of Riparian Reserves in age classes 80 and greater. Once again, the age classes within St John watershed reflect the effect of the 1987 Bland Mountain Fire.

The Roseburg District RMP (RMP pg. 38) restates the requirement in the SEIS/ROD that in fifth field watersheds, 15 percent of all federal lands allocations should always remain in late-successional forest stands. Each of the watersheds in the JDC WAU contains greater than 15 percent late-successional forest within the Riparian Reserves. Twenty-eight percent of all mature and old growth stands in the Coffee Creek watershed ar e found in the Riparian Reserves. Twenty-one percent of all mature and old growth stands in the Days Creek watershed are located within the Riparian Reserves and 18 percent of all mature and old

growth stands in the St. John watershed are found in the Riparian Reserves.

Matrix lands within the JDC WAU will be managed for timber production to meet the Probable Sale Quantity (PSQ) established in the RMP. The following are estimates of acres per decade of GFMA and Connectivity to be harvested :

Table 10: Acres of Proposed Harvest (per decade) in Matrix.

Watershed	Acres of GFMA per decade	Acres of CONN per decade
St. John	97	63
Days Creek	431	88
Coffee Creek	444	80

SOILS / EROSION

When looking at the watersheds from the standpoint of soils and erosion, it becomes clear that most of the BLM administered lands fall within granitic or landslide potential categories. The RMP provides Best Management Practices (RMP, Appendix D) with respect to most forest management practices that are designed to minimize soil loss and maintain soil productivity.

Following is a list of legal descriptions of the BLM managed lands in this WAU that pertain to the Soils of Concern listed in Section III (see Map 5):

A Are least likely to have the before mentioned, four main soils-related properties.

T. 29 S., R. 2 W., Sections 30 and 31
T. 30 S., R. 2 W., Section 19
T. 30 S., R. 3 W., Sections 3,7,11,15,17,19,21 and 27
T. 30 S., R. 4 W., Sections 13 and 15

B Are most likely to have the before mentioned, four main soils-related properties.

T. 29S., R. 2 W., Sections 12 and 19
T. 29S., R. 3 W., Sections 13,29,31 and 35
T. 30S., R. 2 W., Section 5
T. 30S., R. 3 W., Sections 13 and 23

St. Johns watershed is characteristic of group A and Days Creek watershed is characteristic of group B. Coffee Creek watershed is close to an even mix of A and B characteristics.

MINING

It is expected that production of gold from placer deposits will continue. This will result in impacts to riparian zones including the loss of forest cover over long periods of time. Wetlands will be altered and may not recover as wetlands. Short term turbidity increases will affect Coffee Creek, South Myrtle Creek, Days Creek and potentially others.

The present impacts to streams from past mercury mining is unknown, but it can be assumed that mercury is present in some stream sediments and the mercury could be remobilized.

Prospecting for metallic lode deposits will also continue. Acid rock drainage from outcrops containing sulfides is likely occurring at this time. The potential for stream acidity problems and contamination from heavy metals from past mining exists. Future exploration and development work may cause an increase in acid rock drainage problems.

HYDROLOGY / WATER QUALITY

The South Umpqua Basin has been identified by DEQ as water quality limited. Water Quality standards are exceeded for extended periods of time causing degradation of beneficial uses of water. Strict adherence to the Standards and Guidelines as well as Best Management Practices is essential to maintain and protect water quality. Several limiting factors to current aquatic habitat and water quality conditions were identified by the team; sediment loading, absence of LWD, temperature, and water quantity in Days Creek. These factors are interrelated and important to the function with the channel, riparian and floodplain areas. Improvements in road drainage, stream crossings and other design features, and road removal should be considered at all levels of planning to reduce sediment loads into streams. This should also be done in conjunction with improving fish migration. Watershed restoration should begin at the headwaters and progress downstream, in order to avoid the disturbance of habitat downstream from upstream sources. The BLM has contiguous ownership in the upper reaches of Days and Coffee creek drainages, and predominately old growth timber. The timber will continually provide LWD to these reaches, and eventually more habitat complexity downstream via peak flow events. Soils within the watershed highly susceptible to movement should be identified and appropriate BMPs applied to reduce the risk of debris torrents into streams (see soils report).

FISHERIES

The available aquatic habitat data for the JDC WAU suggests the fishery resource has been influenced negatively from past land management activities within these watersheds. Limiting factors affecting the fishery resource in each watershed are similar in nature, but have differing levels of effects on the aquatic system for each watershed. The recovery of at-risk and depressed stocks of anadromous salmonids within these watersheds will be a difficult task given that each of these watersheds are influenced by land ownership pattern and the differing land management objectives for each ownership. For this reason, aquatic restoration efforts leading to the conservation of the anadromous salmonids may be difficult in these watersheds. Cooperative agreements between county, state, federal agencies, and between private landowners should be fostered to encourage the rehabilitation and restoration of aquatic habitats.

The beneficial uses associated with these watersheds differs to a certain degree. The watersheds analyzed provide waters for irrigation, land for the timber production, and land for the extraction of minerals. The impacts associated with each of these activities eventually influence the habitat conditions of the aquatic system.

The BLM administers lands and resident fish bearing streams upstream of the private ownership on Days Creek, Coffee Creek, St. John Creek and a relatively large percentage on

Corn, Fate, and Wood Creeks. The BLM is capable of addressing water quality parameters affecting downstream anadromous fish bearing streams located on the private lands by diligently applying Best Management Practices (PRMP/FEIS, Appendix J, pgs. 43-54) and the Standards and Guidelines described in the ROD for the various land use allocations within the JDC WAU (C 1-48).

The Bureau's role for restoration in the JDC WAU should revolve around improving the water quality conditions. Water quality conditions would benefit from road renovation and road obliteration. Proper drainage structures and erosion control measures applied to the existing forest road network would benefit these watersheds' sediment and water routing processes and would hasten the recovery of their aquatic habitats. The Transportation Management Objectives (TMO) should identify potential restoration opportunities within these subwatersheds. More intensive surveys should be conducted at the project level to determine the need for road renovation opportunities in the area of proposed projects.

WILDLIFE

Within the JDC WAU, 17 spotted owl sites are protected with 100 acre activity centers. Riparian Reserves contain 4769 acres in age class 80 and above. The remaining Matrix lands are designated to meet the PSQ. It is important to manage the timing and spacing of harvest activities in these Matrix lands in such a way as to minimize as much as feasible, the impacts to spotted owls and other associated species.

Six spotted owl sites listed in table 8 are located in connectivity sections or parts of sections. Three are located in the Days Creek watershed, and three in the Coffee Creek watershed. The role that connectivity blocks play in keeping connection of late successional forests across the landscape may be used to benefit the species that use such forests. Connectivity blocks should be used to minimize fragmentation by careful placement of possible harvest units. This should not be difficult to achieve given that stands in connectivity blocks are managed on a 150 year rotations. Of the 7652 acres of connectivity located in these watersheds, only 261 acres are projected to be harvested per decade.

Information about dispersal habitat in section III has been presented as a guide (see table 9). Some quarter townships where the JDC is located, are currently below the 50% threshold for dispersal habitat. This threshold is also used in the "may effect" determination under the ESA. The data indicates that 4 quarter townships are below or equal the 50% threshold level (40%, 43%, 48% and 50%), two townships are at 51-59% level (56%, and 57%), five quarter townships are in the 60-69% level (60%,62%,63%,63%, and 66%), and three quarter townships are at above the 70% level (72%, 75%, and 78%).

Within the JDC watershed the western two columns of T29S-R02W (approx. 7.5 sections) are part of designated critical habitat (OR-29) for the recovery of the spotted owl. Three other sections within the JDC watershed boundary are also part of a critical habitat unit (# OR-31). The specific locality of OR-31 is T30S-R03W-Sections 1, 11, and 13. Suitable habitat acres present in this critical habitat unit is 65% (1080/1713 tot acres) Chris Cadwell, November 1992 Final Critical Habitat, OSO. This is the smallest critical habitat unit assigned in Douglas Co. This makes the functionality of this unit more susceptible to disturbance. This should be kept in mind when developing project in this area of the JDC watershed. Maintaining a

functional critical habitat should be kept in mind while conducting management activities.

Species like neotropical birds may benefit from matrix like management, because the variety of avian species guarantees use of all types of vegetation habitats created. However, many species like the brown creeper, pileated woodpecker, red-breasted nuthatch, pine siskin, western tanager, Vaux's Swift, red-breasted sapsucker, Swainson's thrush, etc. are known to be associated with mature and old-growth forest stands. These species and others animals like many bat species will benefit from a plan to retain connected large areas of older forest through time.

The opportunity is present to develop an elk management goal for the identified management areas and the overlapping watershed analysis areas. Several questions need to be answered prior to developing specific methods.

What level of elk management is envisioned by the Roseburg District and the Resource Area. Some possible options are as follows:
- Manage for elk numbers through careful habitat management?
- Manage for habitat only and let the elk numbers be what they will be?
  Any habitat benefit is achieved as a byproduct of mature forest conversion to younger age classes.
- Maintain early age classes by not allowing growth to older age classes in areas currently 20 years old and younger, and less than 40 acres in size.
- Consider size of harvest units to be 40 acres or less to accommodate use by elk and deer.
- Consider road closure in an amount large enough to influence positive use of habitat by elk.

Any approach to elk management would benefit from information about distribution on and use of the JDC landscape by elk. This information is not available from the ODF&W. A potential conflict is the goal of habitat manipulation for elk and spotted owl habitat.

HUMAN USES

The demand for forest products will continue to drive the harvest of timber from private lands. There is no way to predict the timing and magnitude of these harvests. The RMP has designated Matrix lands within the JDC WAU as available for harvest (see Table 10).
The demand for minerals, agriculture/farm products and recreational opportunities is going to continue to be important in these watersheds. These activities will have some negative impacts to soils, water quality/quantity, fisheries and wildlife. Since we cannot control private landowners, we must focus on mitigating impacts through implementation of BMP's on federally managed lands where feasible.

VI. Recommendations

Priorities for Restoration in the JDC WAU

From a hydrologic standpoint, Days Creek watershed should receive the highest priority for restoration activities. Days Creek has the largest amount of granitic soils. Road treatments to

reduce sedimentation should be considered first.

The roads in the JDC WAU has been evaluated using the Transportation Management Objectives (TMO's) as a guide. A list was compiled of roads that were rated of low value for future resource access needs. Roads were preliminarily divided into the following categories: surfaced roads on BLM to decommission, natural surfaced roads on BLM to decommission, natural surfaced roads that access private lands to decommission, surfaced roads that access private to decommission and roads to be improved (see complete list Appendix C). Roads to be improved are identified as important for access, but needing treatment. Roads that access private would not be decommissioned without the adjacent landowners concurrence. Natural roads on BLM lands to decommission are the top priority. Decommissioning, also referred to as hydrologic obliteration, (which would meet Tier 1 objectives) can be accomplished in the following manner:

Removal of those elements of a road that reroute hillslope drainage and present slope stability hazards. Decommissioning can include removal of culverts, decompaction of the road surface (ripping), outsloping, waterbarring, and removal of unstable or potentially unstable fills. With decommissioning, most of the road bed is left in place, facilitating inexpensive reconstruction should the need arise, but hydrologic risks are greatly reduced (FEMAT V-J).

The following are the top priority natural surfaces roads to decommission:

Road Number	Segment	Length (Miles)
29-3-29.4	A	.58
29-3-31.1	A	.60
29-3-31.0	A	.67
29-3-29.0	A	.99
29-3-29.1	A	.21
30-3-30.3	C	.19
30-3-30.2	E	.18

Roads identified by TMO's are known as "system" roads. They have road numbers, road records, and usually require some type of maintenance. Non-system roads are characterized by jeep roads and trails, usually unsurfaced roads that are not recorded. When I.D. teams are working at the project level, it is important that they use aerial photos and other local resources to identify non-system roads for decommission.

From a fisheries standpoint, Days Creek should receive the highest priority for restoration among the watersheds analyzed because of its' low gradient and accessible stream reaches. Days Creek has a fairly gentle gradient (0-3%) for approximately 10 miles upstream from its' confluence with the South Umpqua River. There are no major instream barriers to complicate upstream migration. Anadromous fish species are capable of accessing approximately 15 miles of habitat within Days Creek watershed. The BLM administers approximately 4.2 miles of this habitat and maintains the ability to protect and improve the riparian condition and instream conditions within

this portion of the anadromous fishery habitat. The mainstem of Days Creek is easily accessible from the existing road system for the delivery of equipment and materials needed for restoration activities. According to the Days Creek aquatic habitat survey, reach #4 appears to have opportunities for riparian and instream rehabilitation (refer to stream reach map). A more intensive survey of this reach at the project level should be conducted to determine the feasibility and the need for rehabilitation activities within this reach.

St. John Creek watershed would be the next priority for restoration. The BLM administers approximately 0.2 miles of anadromous stream in St. John Creek (refer to Table 6). Miles of anadromous stream for Lavadoure Creek is unknown. Lavadoure Creek supports resident salmonids and is suspected to support anadromous fish. Topographic map interpretation suggests that anadromous fishes may access stream reaches located on BLM administered lands in T30S-R3W-Section 19. Further investigation is needed to verify presence of anadromous salmonids in Lavadoure Creek.

Coffee Creek watershed has the lowest priority for restoration. Coffee and Corn Creek's have impassable waterfalls located near their confluence's with the South Umpqua River that limit the anadromy. The BLM administers no land in the anadromous portions of these streams (refer to Table 6).

Priority for identification of potential harvest areas

Matrix lands within the JDC WAU are designated as available for timber harvest. Careful scheduling of harvest areas can help to minimize the short term effects to wildlife and maintain connectivity of blocks over time.

Maintaining large blocks of late successional forests that have physical contact to other late-successional forest stands would serve to provide habitat for species that use late-successional forests, including the spotted owls in matrix lands. This would serve to "provide for important ecological functions such as dispersal of organisms, and carryover of some species from one stand to the next" (RMP ROD). In the eastern portion of the JDC watershed unit, these continuous blocks of late-successional forest are present and surround younger seral age class stands. About half of the owl sites are located in suitable habitat that is currently contiguous in the eastern portion of the JDC WAU. The rest of the owl sites are found on federal lands in the checkerboard ownership. The checkerboard ownership hinders management of these areas to provide connectivity to similar late-successional forest from one section to another.

Forest stands large enough to provide undisturbed interior habitat (area within a forest stand greater than 400 feet from the forest edge) are an important component of retaining biological diversity. Selection of harvest units on matrix lands following the priority list established for spotted owl sites will help contribute to the goal of minimizing fragmentation. and maintaining physical connectivity. This will help meet the "ecological functions" of many other animal species that use forest stands.

The spotted owl master sites associated with the JDC WAU have been evaluated and ranked using three criteria (see Table 8). *Occupancy Ranking* evaluates the duration and consistency of occupation of sites by owls over the past three years. *Acres Ranking* evaluates the amount of suitable habitat within the provincial radius (1.2 or 1.3 miles) and .7 mile radius. *History Ranking* provides a combination of the above criteria with a subjective field evaluation of habitat (stand

structure, location etc.).

When planning timber sales within the JDC WAU, it is recommended that sale areas be selected using the following hierarchy (see table 8) :

1) Areas where owl sites are **not** present should be considered first.

2) if sites can not be avoided then sites that have above 1000 acres in the provincial radius and above 500 acres in the .7 mile radius, with occupancy and history ranking of "3" should be **second**.

3) sites with suitable habitat below 1000 acres in the provincial radius and below 500 acres in the .7 mile radius, with occupancy and history ranking of "3"should be considered **third**.

4) sites with suitable habitat above 1000 acres in the provincial radius and above 500 acres in the .7 mile radius, with occupancy and history ranking of "2" should be considered **fourth**.

5) sites with suitable habitat below 1000 acres in the provincial radius and below 500 acres in the .7 mile radius with occupancy and history ranking of "2" should be considered **fifth**.

6) sites with suitable habitat above 1000 acres in the provincial radius and above 500 acres in the .7 mile radius, with occupancy ranking of "1" and history ranking of "2" should be considered **sixth**.

7) sites with suitable habitat above 1000 acres in the provincial radius and above 500 acres in the .7 mile radius, with occupancy ranking of "2" and history ranking of "1" should be considered **seventh**.

8) sites with suitable habitat above 1000 acres in the provincial radius and above 500 acres in the .7 mile radius, with occupancy ranking of "1" and history ranking of "2" should be considered **eighth**.

9) sites with suitable habitat below 1000 acres in the provincial radius and below 500 acres in the .7 mile radius, with occupancy ranking of "1" and history ranking of "2" should be considered **ninth**..

10) sites with suitable habitat below 1000 acres in the provincial radius and below 500 acres in the .7 mile radius, with occupancy ranking of "2" and history ranking of "1" should be considered **tenth**.

11) sites with suitable habitat above or below 1000 acres in the provincial radius and above or below 500 acres in the .7 mile radius with occupancy ranking of "1" and history ranking of "1" should be considered **last**.

Future road construction in the large blocks of forest in the eastern portion of the watershed unit will contribute to further fragmentation. Methods to minimize fragmentation include reducing road construction, location of harvest areas to reduce fragmenting large forest blocks, and using harvest methods that do not require roads. The feasibility of logging with helicopters should be considered when planning harvests in this area. Aerial yards will help maintain the low

fragmented state of the late successional forest, help meet the "no net increase" guideline for roads in Tier One watersheds, and optimize connectivity.

Other objectives that may benefit from this approach includes benefits to elk and deer in the identified elk management areas (discussed earlier). Road construction usually leads to road use by people. The human use often determines the use of foraging areas by elk and deer. To achieve the most from management action, roads should be selected for closure as outlined in page 39 of the Roseburg RMP ROD, and constructing new roads should be minimized or avoided.

The following is a list of roads identified in the RMP for seasonal closure (Dec. 1 - Aug. 15) to meet wildlife management objectives within the Deadman elk management area:

Road Number	Segment	Length (Miles)
29-2-19.0	A	1.03
29-2-4.0	ABC	4.40
29-2-19.1	A	0.29
29-2-19.2	AB	0.91
29-2-8.0	A	1.51
29-2-20.0	A	1.71
29-2-31.0	A	0.81
29-2-32.0	A	0.59
29-2-32.2	A	1.24
29-2-32.3	A	0.86

Monitoring

Watershed analysis will support decisions for a variety of planned ecosystem management actions within watersheds. Specific actions may include habitat restoration, sediment reduction, road removal and management, timber harvesting, etc. Monitoring will be an essential component of these actions and will be guided by the results of the watershed analysis (S&G's B-32)

General objectives of monitoring as stated in the Standards and Guidelines are:
1) To determine if Best Management Practices have been implemented.
2) Determine the effectiveness of management practices at multiple scales, ranging from individual sites to watersheds.
3) Validate whether ecosystem functions and processes have been maintained as predicted.

The Roseburg RMP Appendix I provides monitoring guidelines for various allocations and resources covered under the plan. Implementation, effectiveness, and validation monitoring questions are addressed. At least 20 percent of all management actions will be examined prior to project initiation and re-examined following project completion.

Some key resource elements to monitor in the JDC WAU are as follows:

All Land Use Allocations
Are surveys for the species listed in the Roseburg District RMP, Appendix H conducted before ground disturbing activities occur?
Are protection buffers being provided for specific rare and locally endemic species and other species in the upland forest matrix?
Are the sites of amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropod species listed in Appendix H being protected?
Are the sites of amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropod species listed in Appendix H being surveyed?
Are high priority sites for species management being identified?

Riparian Reserves
Is the width and integrity of the Riparian Reserves maintained?
Are management activities within Riparian Reserves consistent with SEIS ROD Standards and Guidelines? RMP management direction and Aquatic Conservation Strategy objectives.
Are watershed analyses being completed prior to on-the-ground actions being initiated in Riparian Reserves?

Matrix
Are suitable numbers of snags, coarse woody debris, and green trees being left, following timber harvest, as called for in the SEIS ROD Standards and Guidelines and Roseburg RMP management direction.
Are timber sales being designed to meet ecosystem objectives for the Matrix?
Are forests growing at a rate that will produce the predicted yields?
Are forests in the Matrix providing for connectivity between Late-Successional Reserves?

Key Watersheds
Has watershed analysis been completed prior to management activities?
Is the requirement of no net increase in roads being accomplished?

Appendix A

Glossary

Age Class - One of the intervals into which the age range of trees is divided for classification or use.

Aquatic Conservation Strategy - Plan developed in Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, designed to maintain and restore ecosystem health at watershed and landscape scales to protect habitat for fish and other riparian-dependent species and resources and restore currently degraded habitats.

Anadromous Fish - Fish that are born and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. Salmon, steelhead, and shad are examples.

Beneficial Use - The reasonable use of water for a purpose consistent with the laws and best interest of the peoples of the state. Such uses include, but are not limited to, the following: instream, out of stream and groundwater uses, domestic, municipal, industrial water supply, mining, irrigation, livestock watering, fish and aquatic life, wildlife, fishing, water contact recreation, aesthetics and scenic attraction, hydropower, and commercial navigation.

Best Management Practices (BMP) - Methods, measures, or practices designed to prevent or reduce water pollution. Not limited to structural and nonstructural controls, and procedures for operations and maintenance. Usually, Best Management Practices are applied as a system of practices rather than a single practice.

Bureau Assessment Species - Plant and animal species on List 2 of the Oregon Natural Heritage Data Base, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040), which are identified in BLM Instruction Memo No. OR-91-57, and are not included as federal candidate, state listed or Bureau sensitive species.

Bureau Sensitive Species - Plant or animal species eligible for federal listed, federal candidate, state listed, or state candidate (plant) status, or on List 1 in the Oregon Natural Heritage Data Base, or approved for this category by the State Director.

Candidate Species - Those plants and animals included in Federal Register "Notices of Review" that are being considered by the Fish and Wildlife Service (FWS) for listing as threatened or endangered. There are two categories that are of primary concern to BLM. These are:

> Category 1. Taxa for which the Fish and Wildlife Service has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work.
>
> Category 2. Taxa for which the Fish and Wildlife Service has information to indicate that listing is possibly appropriate. Additional information is being collected.

Connectivity - A measure of the extent to which conditions between late-successional/old-growth forest areas provide habitat for breeding, feeding, dispersal, and movement of late-successional/old-growth-associated wildlife and fish species.

Connectivity / Diversity Block - A land use classification under Matrix lands managed on 150 year area control rotations. Periodic timber sales will leave 12 to 18 green trees per acre.

Core Area - That area of habitat essential in the breeding, nesting and rearing of young, up to the point of dispersal of the young.

Critical Habitat - Under the Endangered Species Act, (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographic area occupied by a listed species when it is determined that such areas are essential for the conservation of the species.

Endangered Species - Any species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

Environmental Assessment (EA) - A systematic analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with National Environmental Protection Agency when no Environmental Impact Statement is necessary.

Ephemeral Stream - Streams that contain running water only sporadically, such as during and following storm events.

50-11-40 Rule - A proposed guideline requiring maintenance of adequate spotted owl dispersal habitat on lands outside designated "habitat conservation areas" for the Northern Spotted Owl. It would assure that, on the quarter township basis, 50 percent of the stands would have conifers averaging 11 inches dbh and a 40 percent canopy closure.

General Forest Management Area - Forest land managed on a regeneration harvest cycle of 70-110 years. A biological legacy of six to eight green trees per acre would be retained to assure forest health. Commercial thinning would be applied where practicable and where research indicates there would be gains in timber production.

GIS - Geographic Information System, a computer based mapping system used in planning and analysis.

Intermittent Stream - Any nonpermanent flowing drainage feature having a definable channel and evidence of scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Issue - A matter of controversy or dispute over resource management activities that is well defined or topically discrete. Addressed in the design of planning alternatives.

Land Use Allocations - Allocations which define allowable uses/activities, restricted uses/activities, and prohibited uses/activities. They may be expressed in terms of area such as acres or miles etc. Each allocation is associated with a specific management objective.

Late-Successional Forests - Forest seral stages which include mature and old-growth age classes.

Matrix Lands - Federal land outside of reserves and special management areas that will be available for timber harvest at varying levels.

Mitigating Measures - Modifications of actions which (a) avoid impacts by not taking a certain action or parts of an action; (b) minimize impacts by limiting the degree or magnitude of the action and its implementation; (c) rectify impacts by repairing, rehabilitating or restoring the affected environment; (d) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (e) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring - The process of collecting information to evaluate if objectives and anticipated or assumed results of a management plan are being realized or if implementation is proceeding as planned.

Nonpoint Source Pollution - Water pollution that does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition or percolation, and normally is associated with agricultural, silvicultural and urban runoff, runoff from construction activities, etc. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, radiological integrity of water.

Peak Flow - The highest amount of stream or river flow occurring in a year or from a single storm event.

Perennial Stream - A stream that has running water on a year round basis.

Probable Sale Quantity (PSQ) - Probable sale quantity estimates the allowable harvest levels for the various alternatives that could be maintained without decline over the long term if the schedule of harvests and regeneration were followed. "Allowable" was changed to "probable" to reflect uncertainty in the calculations for some alternatives. Probable sale quantity is otherwise comparable to allowable sale quantity (ASQ). However, probable sale quantity does not reflect

a commitment to a specific cut level. Probable sale quantity includes only scheduled or regulated yields and does not include "other wood" or volume of cull and other products that are not normally part of allowable sale quantity calculations.

Proposed Threatened or Endangered Species - Plant or animal species proposed by the U.S. Fish & Wildlife Service to be biologically appropriate for listing as threatened or endangered, and published in the Federal Register. It is not a final designation.

Proposed Threatened or Endangered Species - Plant or animal species proposed by the U.S. Fish & Wildlife Service or National Marine Fisheries Service to be biologically appropriate for listing as threatened or endangered, and published in the Federal Register. It is not a final designation.

Resident Fish - Fish that are born, reared, and reproduce in freshwater.

Resource Management Plan (RMP) - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act.

Riparian Reserves - Designated riparian areas found outside Late-Successional Reserves.

Riparian Zone - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows.

Stream Reach - An individual first order stream or a segment of another stream that has beginning and ending points at a stream confluence. Reach end points are normally designated where a tributary confluence changes the channel character or order. Although reaches identified by BLM are variable in length, they normally have a range of 1/2 to 1-1/2 miles in length unless channel character, confluence distribution, or management considerations require variance.

Transportation Management Objectives - An evaluation of the current BLM transportation system to assess future need for roads, and identify road problem areas which need attention, and address future maintenance needs.

APPENDIX B - REFERENCES

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APPENDIX C - MISC. MAPS & TABLES

JOHN DAYS COFFEE WATERSHED ANALYSIS UNIT
NATURAL SURFACED ROADS ON BLM LANDS TO OBLITERATE

ROAD	MILES	WATERSHED	ROAD PROBLEM
30-3-23.3 B	0.10	COFFEE	GROWN IN WITH TREES
30-4-23.0 B	0.56	ST. JOHN'S	NONE
30-3-30.3 C	0.19	ST. JOHN'S	MULCH
30-3-23.1 C	0.21	COFFEE	EROSION/GROWN IN
29-3-23.4 A	0.31	DAY'S	NONE
29-3-29.0 A	0.99	DAY'S	SLIDES/EROSION
29-3-29.1 A	0.21	DAY'S	NONE
29-3-29.4 A	0.58	DAY'S	MULCH/EROSION
30-3-30.2 E	0.18	ST. JOHN'S	MULCH
30-3-13.0 E	0.48	COFFEE	EROSION
30-2-9.1 A2	0.21	COFFEE	NONE
30-3-24.1 B	0.27	COFFEE	??????

JOHN DAYS COFFEE WATERSHED ANALYSIS UNIT
SURFACED ROADS ON BLM LANDS TO OBLITERATE

ROAD	MILES	WATERSHED	ROAD PROBLEM
29-2-19.1 A	0.29	DAY'S/COFFEE	NONE
30-3-13.5 A	0.26	COFFEE	MULCH
30-3-13.3 A2	0.64	COFFEE	SLIDES
30-3-13.4 A	0.63	COFFEE	NONE
SP 1 OFF 13.4	????	COFFEE	NONE
SP 2 OFF 13.4	????	COFFEE	NONE
30-3-3.1 A	0.37	ST. JOHN'S	MULCH/SLIDES
30-3-15.2 A	0.55	ST. JOHN'S	MULCH/SLIDES
30-3-17.1 A	0.55	DAY'S/ST JOHN	MULCH
29-3-25.0 A	0.21	DAY'S/COFFEE	NONE
29-3-13.3 A	0.44	DAY'S	MULCH
29-3-25.1 A	0.65	DAY'S	MULCH
29-3-35.4 A	0.38	DAY'S/COFFEE	NONE
30-2-9.1 A1	0.34	COFFEE	NONE
29-2-9.4 A	0.02	DAY'S	NONE
29-3-29.3 B	0.26	DAY'S	EROSION/PLANTATION
29-4-27.3 A	0.06	DAY'S	NONE
29-2-31.0 A	0.81	COFFEE	MULCH
29-2-32.3 A	0.86	COFFEE	MULCH

JOHN DAYS COFFEE WATERSHED ANALYSIS UNIT
NATURAL SURFACED ROADS THAT ACCESS PRIVATE LAND TO OBLITERATE

ROAD	MILES	WATERSHED	ROAD PROBLEM
30-3-23.1 A2	0.30	COFFEE	EROSION/GROWN IN
30-3-23.2 B	0.38	COFFEE	EROSION/GROWN IN
29-3-24.1 A	0.18	DAY'S	MULCH/EROSION
29-3-24.0 B	0.33	DAY'S	EROSION
29-3-26.1 B	0.87	DAY'S	EROSION
30-2-18.0 B	0.19	COFFEE	NONE
30-3-24.0 B	0.26	COFFEE	SLIDES/ROAD SLUMP
30-3-16.1 A	0.47	ST. JOHN'S	MULCH/SLIDES
30-3-22.1 B	0.17	ST. JOHN'S	???????
29-3-13.0 B	0.27	DAY'S	NONE
29-3-31.0 A	0.67	DAY'S	EROSION/SLIDES
29-3-31.1 A	0.60	DAY'S	EROSION/SLIDES
29-3-27.2 A	0.16	DAY'S	EROSION

JOHN DAYS COFFEE WATERSHED ANALYSIS UNIT
SURFACED ROADS THAT ACCESS PRIVATE LAND TO OBLITERATE

ROAD	MILES	WATERSHED	ROAD PROBLEM
30-3-17.0 A	1.38	DAY'S	MULCH/SLIDES
30-2-9.2 A	0.39	COFFEE	SLIDES
29-3-26.2 A	0.17	DAY'S	MULCH/SLIDES

JOHN DAYS COFFEE WATERSHED ANALYSIS UNIT
ROADS TO BE IMPROVED

ROADS	MILES	SURFACE	WATERSHED	PVT	ROAD PROBLEM
30-3-13.0 A	0.62	NATURAL	COFFEE	YES	EROSION
30-3-13.0 C	0.09	NATURAL	COFFEE	YES	EROSION
30-2-19.0 A	0.27	NATURAL	COFFEE	YES	EROSION
29-3-33.2 A	0.19	NATURAL	DAY'S	YES	NONE
30-4-3.0 C	0.15	NATURAL	DAY'S	YES	NONE
30-4-3.0 F	0.25	NATURAL	DAY'S	YES	NONE

Habitat Bench Marks Related to Category Types

Geo Region:_____ CAT 1 CAT 2 CAT 3 CAT 4

	Bench Mark Weighing Scale 1-5	Category Ranking Numbers 4-Excellent	3-Good	2-Fair	1-Poor	Row Totals
Pools						
a) Pool Area %	2	≥ 45	30-44	16-29	≤ 15	
b) Residual Pool						
Small (1-3 ordered)	4	≥ 0.6	0.41-0.59	0.21-0.40	≤ 0.2	
Large (4th order & greater)	4	≥ 1.0	0.76-0.99	0.51-0.75	≤ 0.5	
Riffles						
a) Width/Depth (wetted) (ODFW)	3	≤ 10	11-20	21-29	≥ 30	
b) Width/Depth (bank full) (USFS)	3	≤ 10	11-15	16-19	≥ 20	
c) Silt/Sand/Organics (% area) (ODFW)	2	≤ 1	2-7	8-14	≥ 15	
d) Embeddedness (% by unit) (USFS)	2	0	1-25	26-49	≥ 50	
Gravel % (Riffles)	3	≥ 80	30-79	16-29	≤ 15	
e) Substrate dominant	3	Gravel	Cobble	Cobble	Bedrock	
subdominant (USFS)	2	Cobble	Large Boulder	Small Boulder	Anything	
Reach Average						
a) Riparian condition Species-dom/subdom. (> 15 cm)	2	conifer/hdwd* Klam-hdwd*	conifer/hdwd* Klam-hdwd*	hdwd*/conifer	alder/anything	
Size (Conifers)	3	≥ 36" Klam-≥ 24:"	24"-35" Klam.-12-23"	7-23"	≤ 6	
b) Shade (%) (ODFW) Stream Width <12M	1	≥ 80	71-79	61-70	≤ 60	
Stream Width >12M	1	≥ 70	61-69	51-60	≤ 50	
LWD						
a) Pieces(lg/sm) 100M Stream	3	≥ 30	20-29	11-19	≤ 10	
b) Vol/100M Stream	2	≥ 40	30-39	21-29	≤ 20	
USFS - Pieces 50' or more long and 24" dbh per mile	5	≥ 70	45-69	31-44	≤ 30	
Temperatures	1	≤ 55	56-60	61-69	≥ 70	
Macroinvertebrates						
Totals for Category						

*Hardwood category does not include alder.
*Where USFS designations appear, either USFS or ODFW measurements may be used but not both.

SPECIAL STATUS SPECIES, Roseburg, Oregon BLM District
23 Jan 95[a]

STATUS/CATEGORY

COMMON NAME	PHYLUM	CLASS	ORDER	FAMILY	GENUS SPECIES	FE	FT	FP	FC 02	3C	BA
Oregon giant earthworm*	**INVERTEBRATES** ANNELIDA	OLIGOCHAETA	HAPLOTOXIDA	MEGASCOLECIDAE	*Driloleirus (=Megascolides) macelfreshi*				X		
Pacific sideband snail (r)*	MOLLUSCA	GASTROPODA	STYLOMMATOPHORA	HELMINTHOGLYPTIDAE	*Monadenia fidelis minor*				X		
California floater*		BIVALVA	UNIONOIDA	UNIONIDAE	*Anodonta californiensis* Lea, 1852				X		
Franklin's bumblebee	ARTHROPODA	INSECTA	HYMENOPTERA	APIDAE	*Bombus franklini*				X		
Vertree's ochrotrichian micro caddisfly*			TRICHOPTERA	HYDROPTILIDAE	*Ochrotrichia vertreesi*				X		
Mt. Hood primitive brachycentrid caddisfly*				BRACHYCENTRIDAE	*Eobrachycentrus gelidae*				X		
Vertree's ceraclean caddisfly*				LEPTOCERIDAE	*Ceraclea (=Athripsodes) vertreesi*				X		
River lamprey*	**VERTEBRATES** CHORDATA	CEPHALASPIDOMORPHI	PETROMYZONTIFORMES	PETROMYZONTIDAE	*Lampetra ayresi*				X		
Pacific lamprey					*L. tridentata*				X		
Umpqua oregon chub (r)		OSTEICHTHYES	CYPRINIFORMES	CYPRINIDAE	*Oregonichthys kalawatseti*				X		
Coastal cutthroat trout (r)			SALMONIFORMES	SALMONIDAE	*Oncorhynchus clarkii clarkii*			X			
Southern torrent (seep) salamander [Olympic salamander] (r)		AMPHIBIA	CAUDATA	AMBYSTOMATIDAE	*Rhyacotriton vaegatus (=olympicus)*				X		
Clouded salamander (r)				PLETHODONTIDAE	*Aneides ferreus*						X
Tailed frog (r)			SALIENTIA	ASCAPHIDAE	*Ascaphus truei*				X[B]		

COMMON NAME	PHYLUM	CLASS	ORDER	FAMILY	GENUS SPECIES	FE	FT	FP	FC 02	3C	
Northern red-legged frog (r)				RANIDAE	*Rana aurora aurora*				X		
Cascades frog (r)					*R. cascadae*				X		
Foothill yellow-legged frog (r)					*R. boylii*				X		
Northwestern pond turtle (r)		REPTILIA	TESTUDINES	EMYDIDAE	*Clemmys marmorata marmorata*				X		
Sharptail snake (r)			SQUAMATA	COLUBRIDAE	*Contia tenius*						X
California mountain kingsnake (r)					*Lampropeltis zonata*						X
Common kingsnake (r)					*L. getulus*						X
Harlequin duck*		AVES	ANSERIFORMES	ANATIDAE	*Histrionicus histrionicus*				X		
Bald eagle (r)			FALCONIFORMES	ACCIPITRIDAE	*Haliaeetus leucocephalus*		X				
Northern goshawk (N. Amer. pop. [r])					*Accipiter gentilis*				X		
American peregrine falcon				FALCONIDAE	*Falco peregrinus anatum*	X					
Mountain quail (r)			GALLIFORMES	PHASIANIDAE	*Oreotyx pictus*					X[C]	
Marbled murrelet*/ critical habitat			CHARADRIIFORMES	ALCIDAE	*Brachyramphus marmoratus*		X				
Northern spotted owl (r)/crit. hab.			STRIGIFORMES	STRIGIDAE	*Strix occidentalis caurina*		X				
Northern saw-whet owl (r)					*Aegolius acadicus*						X
Pileated woodpecker (r)			PICIFORMES	PICIDAE	*Dryocopus pileatus*						X
Purple martin*			PASSERIFORMES	HIRUNDIDAE	*Progne subis*						X

COMMON NAME	PHYLUM	CLASS	ORDER	FAMILY	GENUS SPECIES	FE	FT	FP	FC 02	3C	BA
Western bluebird (r)				MUSCICAPIDAE	*Sialia mexicana*						x
Western meadowlark (r)				EMBERIZIDAE	*Sturnell neglecta*						X
Yuma myotis		MAMMALIA	CHIROPTERA	VESPERTILIONIDAE	*Myotis yumanensis*				X		
Long-eared myotis					*M. evotis*				X		
Fringed myotis					*M. thysanodes*				X		
Long-legged myotis					*M. volans*				X		
Pacific Townsend's (=western) big-eared bat					*Plecotus townsendii townsendii*				X		
Pacific pallid bat					*Antrozous pallidus pacificus*						X
Pine marten*			CARNIVORA	MUSTELIDAE	*Martes americana*						X
Pacific fisher*					*M. pennanti pacifica*				X		
California wolverine*					*Gulo gulo luteus*				X		
North American lynx*				FELIDAE	*Felis lynx canadensis*				X		
Columbian white-tailed deer (r)			ARTIODACTYLA	CERVIDAE	*Odocoileus virginianus leucurus*	X					
White-footed vole*		ed	RODENTIA	MURIDAE	*Phenacomys(=Arborimus) albipes*				X		

FEDERAL REGISTER, 15 Nov 94, FE=Federal endangered, FT=threatened, FP=proposed, 02=Category 02, proposing to list possibly appropriate, 03=was considered for listing but no longer, taxa more abundant or widespread than prev. believed and/or not subject to identifiable threat, if research or habitat change show decline, may later be reevaluated for possible inclusion as Cat 01 or 02; BA=BLM assessment; species not asterisked have been documented in District, r=resident; *=potential occurrence (documentation few or none).

[b]BA in 1991.

[c]02 in 1991. Compiled by R. J. WILK, with N. DUNCAN, R. ESPINOSA, D. McVEAN, G. MIRES, J. WITT.